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**Use of controlling system in Hungarian
health care institutions:
paradox of rise and fall**

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paradox of rise and fall**

Ph.D thesis

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I. INTRODUCTION

I.1. Scope of the dissertation

The research area of my thesis is the controlling systems of Hungarian health care institutions and the utilization of management information generated by controlling systems. I define the controlling systems and the controlling devices in national hospitals, present in details the impact of the health care systems to the controlling – within the budgeting – and examine the scope and style of management information in different management levels.

Encouraging by Management and Business Administration Doctoral School, my dissertation consists of three publications, similarly to the expectations of foreign universities. The body of this dissertation comprises autonomous publications with the results of the research questions. Subchapter I.6 contains a literature summary of the Hungarian research area; Chapters II, III, and IV are the publications. The topic of controlling systems of Hungarian health care institutions (Chapter II.) was published in the Hungarian Statistical Review, Volume 93, Number 8-9. Chapter III will be published in the Budapest Management Review and based on it, a paper for the 21st International Research Society on Public Management conference and a poster for the European Health Management Association 2017 was prepared and accepted. The publication of Chapter IV (use of management information in hospital decision-making) will be in Egészségügyi Gazdasági Szemle (Hungarian Health Economic Review). The contents and form of these chapters are identical to the articles. The aim of the introduction is to synthesize the thesis and to make the reading clear and coherent.

The questionnaire developed in the SROP 6.2.5-B-13/1-2014-0001 project named ‘development of organizational efficiency in the health care system - the development of regional co-operation’ was used in my thesis. The project was launched by ÁEEK (National Health Care Services Centre, maintenance organization of state-owned hospitals) to increase the operational efficiency of the health care system. The purpose of the reorganization is to bring health care closer to the population so that the more and the high quality of care can be accessed close to the place of residence, in a sustainable manner (Government Decision 1219/2014) The sub-target of the project concerning of the thesis is to develop the regularity, consistency, and quality of available management

information and decision support system for institutional managers and maintainers. In this framework a uniform chart of accounts, the department and case level controlling methodology and manual has been developed. During its implementations, 51 institutions successfully started the departmental controlling system, and 12 institutions collected cost data of 2440 total cases with the case level controlling methodology (Nikliné, 2016). The national dissemination took place after the implementation period, but its impact is not yet known.

Due to limitation, my research only marginally contains the field of international controlling systems (definition is in Appendix VIII.1.) and international health care systems (Appendix VIII.7.). Furthermore that I did not clarify the definitional confusion in health care systems, e.g. performances, I accept those original interpretation, used in the sector.

I.1.1. Relevance of the research topics

After the Second World War – due to the expansion of the insurance system – public resources arrived in the health systems of developed countries [Orosz, 1999], ensuring the cover of the rising health care costs until the economic crisis. The increase of health care costs was realized due to several factors: rising consumer expectations, demographic changes, population health status and lifestyles (aging), moral hazard phenomenon, health technology cost-increasing or development of price and salary in health care [Orosz, 1999, Gulácsi, 2005, Schultz, 1983]. The expenditure of health care began to limit because of the increasing gap between the technically possible, medically necessary and be financed from public funds [Gulácsi, 2005].

In Hungary, the period of expansion is missed, moreover, the health spending of GDP still remains low [Orosz, 1999], currently it is 7.4% of the GDP (average of the OECD is 8.9%) [OECD, 2015]. Thus, since the mid-90s, the Hungarian health care moves in ‘vicious circle’ because the continuous decreasing of resources from health sector is insufficient to resolve the structural problems of health care [Bodrogi, 2010]. Furthermore, the average drop in GDP – generating the economic crisis – was almost twice in Central and Eastern European countries as the drop in the euro-zone [Baji et al. 2015], which is caused the low health care resources even further reducing. Because of the cost-containment, the demand for information- and evidence-based decisions may increase and the maintaining of the health care quality becomes a challenge for governments [Gulácsi et al. 2012]. In many Western European countries the movement of New Public Management (New Public Service Management) has appeared with reforms focusing on effectiveness and efficiency and these measurements by using management devices from business sector. [Rosta, 2012, Drótos et al., 2007, Bodnár et al., 2011, Nyland – Pettersen, 2004].

In health policy, the European Union has taken steps to confirm the common values and principles but assets and reforms were implemented variously [Bodrogi, 2010]. Hungary also has made numerous programs and plans for sustainable of health care but management information and decision support have negligible role. These reforms are based on macro level and typically focus on health care resources and structures. The financing method has influence on efficiency and quality of services by the behaviour (performance enhancement, DRG manipulation, competitive attitude and cost

devolving) of providers and purchasing agent [Orosz, 2001]. The organizational effectiveness could be appreciated by controlling systems, it is responsible for goal setting, planning, performance measurement and monitoring, ensuring information for decision making, coordination of these activities and last but not least, implementation of economic transparency [Horvath, 1997; ICV IGC, 2012].

Anthony – Young (2003) writes that the majority of management-control studies was published in the context of for-profit sector where management control techniques originate from. The clean target resulting from the maximizing of profit in for-profit sector is not relevant in the non-profit organizations; nevertheless, it is necessary to be clarified before the establishment of the system (Merchant, 2007). According to the author, managers are struggling with the same management problems as others do in for-profit organizations and the control devices are fundamentally the same because of organizational maturity, however, the management control systems of non-profit organizations are not as advanced as in profit-oriented organizations. The managers are not trained in management sciences and have to deal with more difficult management and control problems as well as scarce resources. Personal and quality limitations can be discovered due to the difference of salary but commitment might minimize the control problems and lack of motivation. Merchant says that leaders are unable to practice organizational management in an optimal way because of selectional reasons (e.g. providing large donation for the organization or being a friend of a senior official); in addition, external pressure might also affect decision-making processes. As a result, the planning and budgeting processes are likely more important and time consuming that is refuted by Lapsley (1994) whose research indicates that in the loosely related organizations of public sector, accounting rules and other formal processes are less important than those of the private sector.

The spread of management control in health care organizations can be realized in the support of efficient resource allocation and providing of information services about managerial decisions. The system, however, often remains quite formal what can be attributed to such reasons like incomplete knowledge of workers, out-of-date integrated information systems, deficiency of managerial information and insufficient public financing according to Baran (2013).

The issue of health care controlling research originates from the actual problems: decrease of health care resources, disproportionate financing and restrictive elements of the public health system. Understanding the international literature could start a common (policy and/or organizational) thinking and creation of a professional platform, such as collection and dissemination of the best practices. Its milestone is the standardization of controlling methodology in the framework of SROP 6.2.5-B-13/1-2014-0001 project named ‘development of organizational efficiency in the health care system - the development of regional co-operation’. The enlargement and standardization of management information systems, controlling systems are emphasized priority: constitute a unique methodology for department and case level controlling. The future application and further consideration could result a higher level usage of health care management information. My thesis contains structured information for support and applies management information in addition to a unified idea of the current understanding of health care controlling.

In the Hungarian health care literature over the last twenty years, some publications appeared from practical controlling field, but comprehensive scientific exploration still not occurred. First, I present and process the pattern of controlling systems in Hungarian health care via opinions and experiences of developers, experts and users (institutional managers, decision supporters), as well as manager of governmental owner.

The choice of research area was also affected by my motivation and professional background. At the beginning of my career I used to deal with financial accounting, then management accounting; for the past nearly 15 years I benefited my knowledge in organizations of health care sector as controller, accountant, later manager and consultant. During my consulting work I recognized the problems of the Hungarian health care systems and ideas for solving attempts. To deepen my knowledge and emphasize scientific work, too, I regularly visit conferences with paper as well as, participate in several studies. The elements of thesis methodology such as focus group or structural modelling were supported by professionals; not only in theory but also in practice (creating effective atmosphere, motivating and controlling the group dynamic processes, or interpreting the results of the model). Therefore, special thanks to Prof. Dr. Habil. Füstös László, professor of Corvinus University of Budapest and to Sipos László, associate professor of Szent István University.

I.1.2. Target groups of the thesis

The fraction of national literature contains publications in the context of health care controlling; a total of three journals are close to the topic of my study. Because of the unexplored research area, my primary goals are

- to collect and systematize the national literature, the focus of researchers and professionals,
- to explore the controlling systems used in Hungarian health care institutions and these effects on internal and external changes, and
- to introduce the managerial application of controlling systems.

By the control mechanisms of health care institutions, not only the – narrowly defined – controlling system can be known but the motivation system is required to organizational operation. Related to the systems, my objectives were

- to get to know and demonstrate the motivation and expectation of controlling application by the top management and medical managers, decision support staff and last but not least, managers of maintenance, and
- to introduce the importance of controlling systems for health care institutions, which can be useful in the narrowing health care resources.

The emphasized goal is to publish the results of the Hungarian health care controlling.

- The broader toolkit of controlling and the collected best practices help the decision-makers and controllers in their work.
- A further aim is to encourage the use of these devices, both institutional and maintainer/policy level.

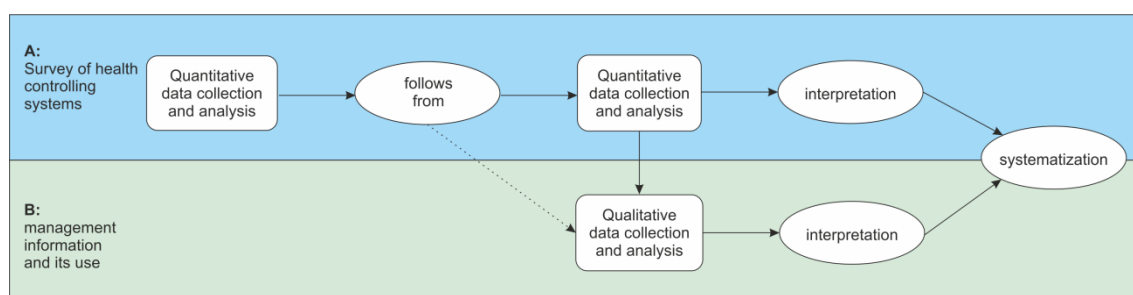
I.2. Methodology

Methodology section is intended to summarize the comprehensive method of my research, the specified descriptions and applications are detailed in the publications (Section of II., III., and IV). The methodology based on controlling literature; I present the controlling systems in Hungarian health care in Chapter I.6., in a spread of publications (18 pages). The international literature presents the use of management information (scope and style) and the results of international researches are presented in Subchapter IV.2. The presentation of controlling systems is limited to define, as written in my target of doctoral thesis, and is not divided by areas such as development of management control systems, or even differences of Anglo-Saxon and German management control since Bodnár [1997] did it in her thesis.

The thesis is logically composed of two parts of research: exploration of controlling systems in health care and analysis of use of management information. It is not necessary to use different (quantitative and qualitative) methods for the two parts, but undoubtedly the statistical analysis was evident because of the existing of SROP questionnaire, which covers almost all Hungarian hospitals. In recent times, the increased reporting obligation of hospitals does not allow to create a new, self-developed questionnaire for data collection with different approaches. The result of the survey enables to know widespreadly the controlling system and to signalize those areas where the personal involvement is essential for deeper understanding. Almost the research topic selects the application of *Grounded Theory*, linked to Glaser and Strauss [1967]. By knowing the theoretical background of the common application of quantitative and qualitative techniques, I chose the *mixed methods research*, named the third paradigm in the latter period. The researches are based on mixed methods target of coordination of different methodologies and differ from *multimethods research*, in which more qualitative or quantitative methods are used [Király et al., 2014].

The exploration of controlling systems is examined with mixed methods, added further research issues for use of management information because of the close interconnection of the two subjects. In my research, the methodology is succeeding explanatory mixed method structure [Király et al., 2014] or interpretative sequential modelling [Santha 2013b]. As the resulting figures and tables of controlling questionnaires (quantitative data analysis) remain sterile without deeper knowledge

[Santha 2013b], therefore it is complemented with qualitative study and the results are jointly interpreted.



1. Figure: Methodology of the thesis (own figure, based on Creswell – Plano Clark [2011] and Király et al. [2014])

The Chapter II. of the thesis is based on quantitative analysis using structural modeling techniques – SEM LVPLS model – for settlement of the controlling health care system factors in a single structure. Chapter III. and IV. examine the research questions with qualitative tools: homogeneous focus group and individual interviews with managers of hospitals and owner and experts or consultants.

The first table summarizes the applied method based on parameters of research elements, sample, data collecting and analysing.

	Statistical path analysis	Focus group	Interviews with experts, managers and owners
research	A	A and B	
sample	almost the whole population – governmental institutions	participation from different institutions (type of hospital and number of bed), controlling or financing area	managers of owner experts/consultants managers of hospitals
data collection	questionnaire	focus group - interview	interview
software	IBM SPSS 22	Verbi MAXQDA 12	

1. Table: Summary of selected methods for answer of research questions (own table)

The statistical analysis examined the institutions maintained by ÁEEK, the sample covers almost the whole population of public financed health care providers. The size of the sample covers the population of health care providers – except university clinics, the Medical Centre of Hungarian Army and some small foundations and ecclesiastic

providers. Then the qualitative study builds on the findings of the statistical analysis; the sample includes different types and sizes of institutions – paying particular attention to the response of universities – and private health care institutions. Community health centres, regional hospitals, national institutions, universities and rehabilitation centres are in the sample. For the selection of the institutions, the applying of controlling system (data from questionnaires) was taken into consideration. In addition to the hospital general directors, experts (know all health care sector) and leader of maintainers were also asked for generalization of research results.

I.2.1. Introduce of quantitative research

The framework of the quantitative method consists of a processing of simple statistics variables and a structural modelling, based on controlling questionnaires developed by SROP project. The self-reporting survey includes controlling data of almost all the public hospital, financed by National Health Insurance Fund of Hungary. It focuses on the frequency of controlling activities such as the rate of decision support or information service. The data, after processing in Microsoft Excel, were exported, coded and statistically analysed in IBM SPSS 22 program and the factors and their relationship of Hungarian hospitals' controlling system were evaluated and presented. The variables describe the planning and control activities in hospitals and highlight the widely different usage of systems. Because of the low record number and the lack of normal distribution [Henseler et al., 2009] we decided to set up a complex structure with correlation of classical controlling process. Thus paths were defined between the variables, provided that they determine each other in accordance with the definition of controlling. The variables and paths collectively define the system of regression equations [Koltai, 2013], in the outer (measurement) model, the least squares method can be used to calculate the path coefficient [Naranjo-Gil, 2009]. The results are presented in a clear, interpretable way.

I.2.2. Devices of qualitative research

For deeper recognition and detailed presentation of the controlling systems, outlined by quantitative research, interviews and focus group were used [Babbie, 1995; Bloor et al., 2001; Kitzinger, 1994; Morgan – Krueger, 1993; Vicsek, 2006]. The advantage of the focus group interviews is the more efficient data collection, except the careful preparation, [Becker, 2006] and more information can be gained by using synergies between group members [Héra – Ligeti, 2006]. Focus groups have a strong social influence on group [Vicsek, 2006], which is more dominant in the homogenous group of decision supporters (mainly controllers). The implementation of the focus group research unit was enormous challenge because of the overlaid hospital managers, some colleagues' skype accession solved the problem for the second occasion. But the focus group study was indispensable: 'the deep understanding and knowing of potential features may offer and it may reveal such aspects that the researcher does not think.' [Vicsek 2006]. To reach the impact of better engagement, I set an additional questionnaire before the focus group interviews (see in Appendix IX.1.). With the knowledge of individual opinion, the interview process can be accelerated [Vicsek, 2006].

In the individual interview, I tried to get to know the deeper motivations, attitudes of the hospital managers, experts and owner managers, which drive their behaviour in a particular way [Sipos, 2009]. The interviewed managers were exclusively from the top management team of hospital: the general director, in one case (one of the biggest hospital), medical director was interviewed. In the research, the economic director leads the controlling unit, so I considerate the decision support function. The interviewees were typically from the hospital with one of the largest number of bed, because the decision support will become more pronounced with the size of the institutions. The 11% of central medical institutions, 25% of universities were known by respondents, three interviews were made with enterprises financed by NHIFH, two of them are owned by the state.

In the individual and focus group interviews, questions of two research topics – presented in Subchapter I.3. – were translated into indirect, simple questions with few words [Krueger, 1994, cited by Vicsek, 2006]. During the interviews, semi-structured interview situation was generated and applied method of growing structuring, thereby

utilizing the advantages of the very and semi-structured interviews. The interviews were recorded, typed, and then MAXQDA 12 software was used for their evaluation. The software is based on *Grounded Theory* [Sántha, 2013a], and has regular window text encoding system which is equivalent to manual coding: it divides the data into parts, conceptualizes and puts them together in a new form [Gelencsér, 2003].

I.3. Research questions of the dissertation

The thesis is logically composed of two parts of research: A) exploration of controlling systems in health care and B) analysis of use of management information.

A.	Controlling systems in hospitals
1	What does controlling mean is the daily routine?
2	What kind of tools do top managers use for decisions?
3	How does controlling modify operation and decision-making?
B.	Use of management information and controlling system in different managers levels
4	Where are information points in hospitals for supporting decision-making?
5	What is the scope of management information?
6	How do the top managers and medical managers use the available information?

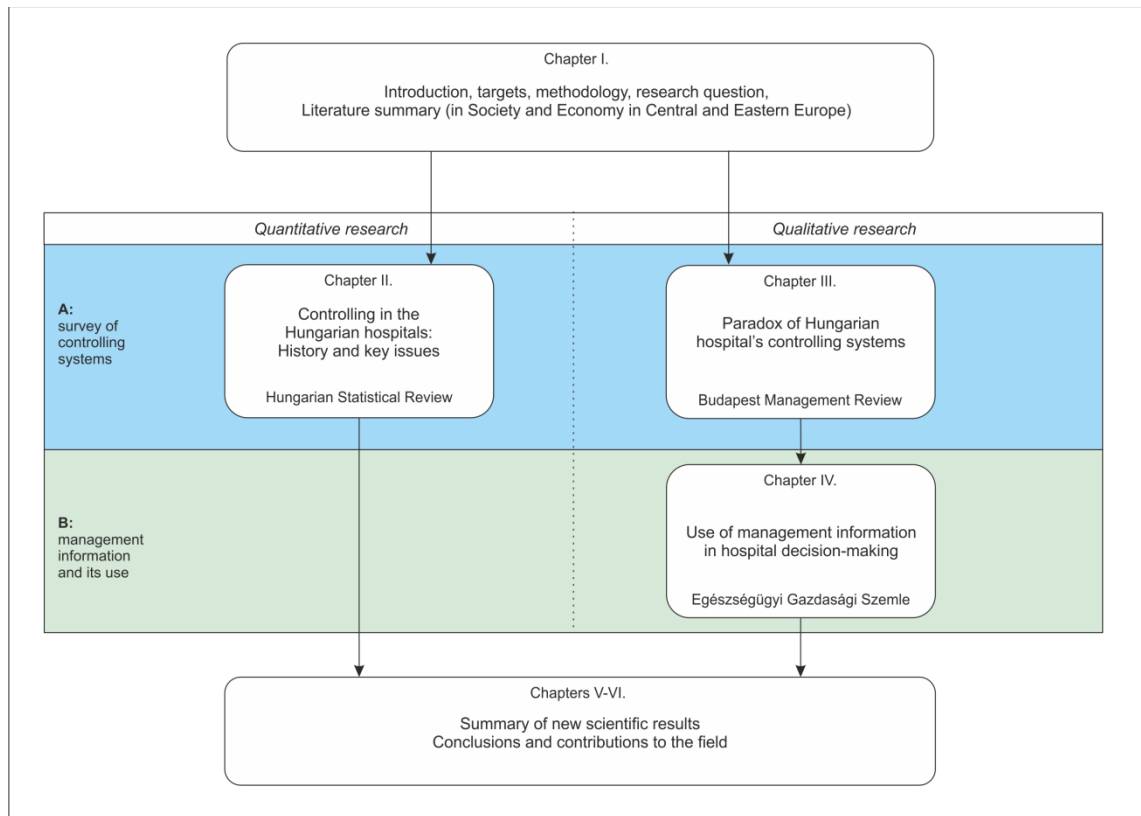
2. Table: Questions of the two research units (own table)

For the fifth research question I accepted and used definition of Bouwens – Abernethy [2000], the scope of management information is a continuum with narrow and broad scope. The wide-area management information is non-financial, future oriented and in external focus which offers a wider range of possible solutions to managers. The narrow scope uses classical information: internal focus, financial and past-oriented.

I.4. Structure of the dissertation

The introduction of doctoral thesis presented the research area, appointed the used methodology and defined the research questions. The other chapters are built on the specific research results:

- Chapter II. analyses the controlling systems of health care institutions with data and indicators,
- which is supplemented with qualitative method and interpreted in Chapter III.
- The utilization of management information is measured and evaluated in Chapter IV.
- The Chapter V. and VI. do not only summarize the results but make proposes for usage and development of controlling systems and highlight the benefits with using the devices of controlling.



2. Figure: Structure of the dissertation (own figure)

I.5. Characteristics of health care institutions

The curative activity of health care institutions can be characterized by a high degree of heterogeneity; hospitals provide a wide range of health services (basically not profit-making activities) in several professions and type of care for diversity of patient populations. Nevertheless, the targeting in private sector (establishment of objectives and strategies) and the focus of effectiveness need to be followed in the health care system, too. Thus, the control activities of the two sectors could be similar, but the role of the control process elements varies in institutions and managerial levels. The top managers and department managers of the hospital have different attitudes to basic and economic processes, thus in the process of control, the weight of element varies on organizational and managerial levels.

Examining of hospital use of management control, Morelli – Lecci [2014], Nyland – Pettersen [2004], Aidemark – Funck [2009] also noted the fundamental role of power and politics in the operation of the hospital organization. The power is the main driver of hospital behavior; hospitals take bureaucracy and can be characterized with strong resistance against the change [Denis et al., 2001 és Abernethy – Vagnoni, 2004 Mintzberg, 1983, Morelli – Lecci, 2014]. The bureaucratic control in hospitals are insufficient [Mintzberg, 1979] and the control with measurements (market control) is difficult to realize [Ouchi, 1979]. Morelli – Lecci [2014] and Lega [2009] justified the difficult change with the following reasons:

- discretion leaves the professional autonomy and results cultural conflict between the professional and management;
- stronger problem of coordination occur with the internal boundaries between different specializations;
- due to a long professional learning and research process, the profession uses bureaucracy;
- triangulation problem arising from professional driving (close relationship with political, scientific and external bodies which can affect hospital management).

The political, medical and administrative aspects of the health organizations have various objectives, success factors and methods of work [Aidemark – Funck, 2009,

Kouzes – Mico, 1979]. According Morelli – Lecci [2014] health organizations are classic pluralistic institutions with different goals (individual, patient care, efficiency and quality) and many participants (managers, politicians). Hospitals, as many professional institutions, are gerontocratic organizations where change may only take place if the innovative incentive is supported by a reputable management team. The professional time, experience and professional network are connected to the reputation, thus the other key factor is the charismatic general manager with heterogeneity of top management.

Mintzberg uses the definition of expert bureaucracy for the institutions' work with expert dominance on complex task. The work of the doctors (experts) is complex and the acquisition of knowledge takes long time, and training are also constantly expected [Óváry, 2014]. The necessary skills, knowledge slowly change and its standardization is the main coordination mechanism. In the work, the autonomy of physicians is significant; they work relatively independently from the colleagues, but in close contact with the patient [Takács, 2012]. The professional service heterogeneity, health insurance and financing specialties, differences in the participants' interests impress to the controlling systems and a complex picture is resulted.

Some authors [Krokovay – Kohán, 2004, Óváry, 2014, Takács, 2012] approach the concept of hospital controlling from the characteristics of the health institutions, thus emphasize the speciality of health services: heterogeneous and complex activity. 'It is said that

- (1) we provide a product or a service which is plenty of uncertainty,
- (2) has not been paid, or never pay (!),
- (3) for someone who does not pay, but also someone, sometime,
- (4) while the buyer does not know his real demand,
- (5) we sell not just product, but 'goods', too,
- (6) during the activity, we do not know the real revenues and
- (7) we will also need to provide when the activity has deficit'[Krokovay - Kohan, 2004].

The operation of medical institutions affects many organizations and/or individuals: they contribute to the achievement of the institutional objectives in various ways. The stakeholders are in long-term and mutual relation with the institutions and affect the min the achievement of organizational goals. These actors are summarized in Figure 3. In the design of qualitative research, I elected the internal and external stakeholders with knowledge of the controlling systems.

Primary stakeholders	Secondary stakeholders
ministry, politics, state secretary of health	Top management
maintainer/owner (AEEK)	Middle management
local governments	Decision support (controlling, financing, public procurement...)
agencies for financing (NHIF, private insurance)	Physicians
authorities	Nurses
international organizations, social organizations	Other staff
experts	
suppliers, 'creditors'	
'competitors'	
media, press	
patients, others service customers, advocacy organizations	

3. Figure: Stakeholder modell of health care institutions (own figure)

The secondary stakeholders of the health institutions are the managers of the hospital (top and middle managements) and employees (decision supporters, specialists, nurses and other staff). The ministry/state secretary of health, maintainer, local government, authorities, international and social organizations, suppliers, other hospitals as competitors, media and patients are primary or external stakeholders. The experts, consultants were highlighted as a major concern, by having a comprehensive image of the entire health care sector.

I.6. Controlling in the Hungarian hospitals: history and key issues

This chapter of the thesis is published in Society and Economy in Central and Eastern European, with corresponding content and form.

The aim of this summary is to illustrate the areas of interest and the thinking focus of Hungarian hospital managers by providing a summary of the relevant Hungarian health care controlling literature and to give an introduction of potential research directions. The publication summarizes the "public discourse", the controlling thought, and simultaneously highlights the priorities of health care as well.

The main range of interest is the financing problems and their solutions as well as other kind of uncertainty arising from the continuous changing of roles and measures. In the early 90s some health care institutions started to apply controlling systems as a result of the introduction of performance-based financing and often published articles about it till the limitation of performance (year 2004). In 2015 a project created to enhance the operational efficiency of the health care system restarted the controlling thinking: unified management measures required for hospitals may induce the development of the controlling data service, more accurate reporting, management attention, and experience sharing.

Keywords: controlling, management control, health care, summary

JEL codes: M10, M40

I.6.1. Introduction

The icons of classical organization theories (Fayol and Taylor), formulated statements based on personal experience and developed them to become more general (Balaton 2000). Then in the 80's the challenges of competitive environment and practices motivated the development of traditional costing and management control (Kaplan 1984). To modernize the processes of management accounting and management control he suggests the exploration of innovative practices (field-based

researches) introduced successfully by other organizations. Atkinson et al. (1997) add that there is a need to research the interactions between non-profit organizational structure and management accounting and the differences of for-profit and non-profit organizations. International management control has been broadening continuously from simple definitions to complex models and package approaches, since systems have taken the distinctive aspects such as organizational behaviour, cultural values etc. increasingly into consideration. The dominance of information supporting decision-making was taken over by the spread of control, thus for example remunerating and compensation systems were connected to it. The management control has been continuously improving, in line with managerial claims, the interest of researchers and practical problems. It is more specific in the non-profit and in the health care sector: the treatment of persistently increasing cost-consciousness (Chua 1994) invokes for-profit management control techniques (Anthony – Young 2003, Merchant 2007). This cost containment is present in Hungary too: since the mid-90s the Hungarian health care has been moving in a ‘vicious circle’ because the permanently decreasing resources in the health sector are insufficient to resolve the structural problems of health care (Bodrogi 2010). Currently the health spending of GDP is 7.4% (average of the OECD is 8.9%) (OECD 2015), but the average drop in GDP – generated by the economic crisis – was almost twice as massive in Central and Eastern European countries as the drop in the euro-zone (Baji et al. 2015), which caused the low health care resources to be reduced even further. Because of the cost-containment the demand for information- and evidence-based decisions may increase (Gulácsi et al. 2012), which is the task of the management on hospital level and the means for it is controlling systems. With a lack of similar controlling research in health care, the only e-learning textbook to be found is by Bodnár et al. (2011), which fills this gap and guides the reader through the elements of management control model by Anthony – Govindarajan (2009) from the aspect of health care. This publication examines these elements and organizes the thinking of hospitals to various controlling approaches. The publication summarizes the area of interest of experts and managers with a positive approach, using the nearly 30 years of history (historical development and general examination of phenomena) of health care controlling.

I.6.2. Research methodology

Understanding the controlling context and the management's expectations of Hungarian health care institutions were the motivations to prepare this publication, in which the theoretical educators and practitioners helped. The aim of this paper is to identify major works on controlling research concerning health care organizations, and thereafter to classify them so as to identify gaps, issues, and opportunities for further research. MATARKA database was used with some important keywords such as 'controlling', 'management control', 'hospital', and 'health care'. Then a review of Hungarian journals (IT and Management in Health Care (IME); Hospital and Health-Economic Review) and solely annual conference organized by IME has been composed.

The focuses emerging in literature are: the necessity of controlling, the definition of control and management information, cost and coverage accounting, other tasks delegated to controlling, and the role of motivation systems. In these categories, different controlling approaches are outlined: financial approach, cost and coverage approach, benchmarking-centred approach, approach based on motivation and information-centred controlling approach, all of which are explained in the writing.

To establish a time span, the starting point was 1997, the year of the publication of the first controlling thesis (Bodnár 1997), 5 years after the financing reform (Hungarian DRG system's introduction) in hospitals and the first introduction of hospital controlling system.

I.6.3. Controlling in national health care institutions

I.6.3.1. Definition of health care controlling

In the Hungarian theoretical and practical education of controlling and in the related literature, several authors (Horváth 1997, Boda – Szlávik 2001, Hanyecz 1997) start their book with rudiments of accountancy within the general methodological bases of controlling, named as 'the controller's language knowledge'. But it is added that 'the controller is not an accountant. For him another dimension of the accounting is important. The substantive difference is not in the depth of accounting knowledge but in the distinct structure of it' (Boda-Szlávik 2001). Hanyecz (1997) named accounting as

the fundamental tool of controlling which provides data for the management of the company. Management accounting can be built on the accounting knowledge: management accounting is a ‘modification of accounting that considers the interests of business management as a priority emphasized beyond the interests of the review of business processes’. Then the inside and outside information function of the organization can lead to the definition and functions of the management control. For example, Laáb (2001) defines both the support of managerial decision-making and impact analysis regarding decisions as the main tasks of management accounting and controlling in the period of planning and realizing. Hanyecz (1997) collected the building stones of controlling: (1) management oriented accounting, (2) targeting, planning, control, (3) reporting system, (4) analysis and evaluation, (5) contra-indications, counteractions for the correction of management. According to Dobák – Antal (2010), control is a ‘process based on feedback, helping to achieve the organizational goals. In advance, the managers establish, measure, and compare standards of certain characteristics of the controlled entity and intervene in case of deviation of actual characteristics’.

In the most cited and accepted definition in the Hungarian context Horváth (1997) stresses that ‘controlling is a complex management tool with the task of coordinating the planning, control, and information flow’. The three main elements of the regulational circle of controlling are the (1) establishment of performance measurement (planning), (2) plan and actual data comparison, and (3) the correction of deviations, counteractions. Balogh (2005) writes essentially the same but in a more detailed manner: formation of goals, collection of information, creation of strategic and operational plans, analysis of deviations, exploration of reasons for deviations, intervention and information support.

From another point of view, Boda et al. (2011) harmonize the establishment of controlling systems with evolutionary phases of organizational development (creativity, management, delegation, coordination, collaboration), namely, the formation of controlling system begins in the management phase and starts to develop in the period of delegation. For the summary, Bodnár’s (1997) comprehensive definition was adopted: ‘controlling systems are management supporting formal devices which serve planning, measuring, evaluating, and feedback for managers, on institutional and department levels’.

In principal, controlling is an essential device of health care management. According to Papp (2003), it is used despite its negation (the manager of the organization applies it consciously, organizing it into a system or inducing difficulties with ad-hoc questions for his environment), the health care organization is not manageable without planning; feed-backing; capacity, performance and cost monitoring, and analysing. Kis (2005) adds that controlling helps to make the management well-informed with economic, financial, and professional data, and in addition with plan and actual data comparisons, assessment, monitoring and liquidity management. The activity of organizational controlling is the (1) step-by-step elaboration, detailed quarterly, overviewing monthly of up-to-dated management information systems, of controlling conception and management approach, (2) the preparation of the initiation of a unified information system, and last but not least (3) the improvement of the controlling organization itself. Szabó (2001, 2003) summarizes the tasks of controlling on the basis of the operation of controlling in his hospital: the hospital management plan is made annually (income, permanent obligations, operational costs and developmental resources), the plan is divided into entities with incomes and the desirable breakeven indicators are arranged, then, monthly reports are made about plan and actual data comparisons constituting the base for management decision-making and/or motivation systems. Kis (2005) emphasizes that ‘fairly underfinanced health care organizations should get feedback about their efforts and the realization of their plans on one side, and forecast about increasing threat and anomaly, on the other’. Baráth (2002) calls it ‘traffic light’: controlling helps the activity of the organization to be more efficient, it indicates the problems. These forecasts only partially work, because one of the great weaknesses of Hungarian health care controlling is planning.

Formally, the functional elements of a controlling system constitute an integral issue on strategic and operational levels (Körmendi 1998). The author argues the role of planning, in other words, if there is no planning process, but solely actual data analysis, the activity cannot be interpreted as controlling. (According to Flamholtz (1983), there is even a ‘control system’ that consists merely of a planning system with little else.) Even though Csidei (2005) has qualified planning as a success factor for a decade, few Hungarian publications concentrate on the methodology of strategic planning (Kiscsordás – Gyüre 2003, Bodnár – Papik 2013, Baráth 2002, 2010) and practical experience of operational planning (Szedleczi 2003a,b).

More definitions and phrasings related to the controlling task deriving from practical usage, published in the health care management journals (Papp 2003, Kis 2005) are close to the controlling definitions taken over from business life. In addition, Molnár – Nagy 1996, Kis 2005, Bodnár 2004, Bodnár – Papik 2013 mention that controlling turns into philosophy: ‘managers have to respond to the essential plan-and-actual data differences and they have opportunity for taking measures in accordance with targets agreed’ (Molnár – Nagy 1996). Kecskés (2003) stresses the following functions: ‘preservation of medical professional and economic autonomy, prolongation of the time horizon of strategic planning, formation of service structure in a conscious manner, continuous development of the organization, quality assurance, privatization strategy and practice, and the controlling as usage of managerial tools’. Expanding these methods in their series of articles, Bodnár – Papik (2013) write about those analysis and management devices as well as models which could be factors of success with assurance of designated destination, execution and control.

Last year, the earlier and mainly subjective, experimental definition was replaced by a single controlling determination, developed by experts (Bsoft 2015a), and a controlling handbook was written (Bsoft 2015b). The interpretation of controlling is ‘an organizational management device or system with a function of target setting, planning and information supply for performance measurement, control and decision-making, the coordination of these activities and the transparency of economic and efficiency’ (based on Horváth, 1997 and ICV-IGC 2012). This definition not only clarifies the earlier interpretations, but also provides possibility to research into controlling activities in terms of common definition.

I.6.3.2. Historical development of hospital controlling systems

According to Baráth (2010), ‘as a result of the remarkably rapid technical development the issue of price of medication or more generally, the issue of the financing has become the core point of medication. By now an ever widening gap has been formed between the medically possible and the economically affordable’. This causes an increasing demand for resources of health care, and accordingly the requirement of continuous verification of financing of processes. Early works in the topic of controlling connect the evolution of institutional controlling to the specialities

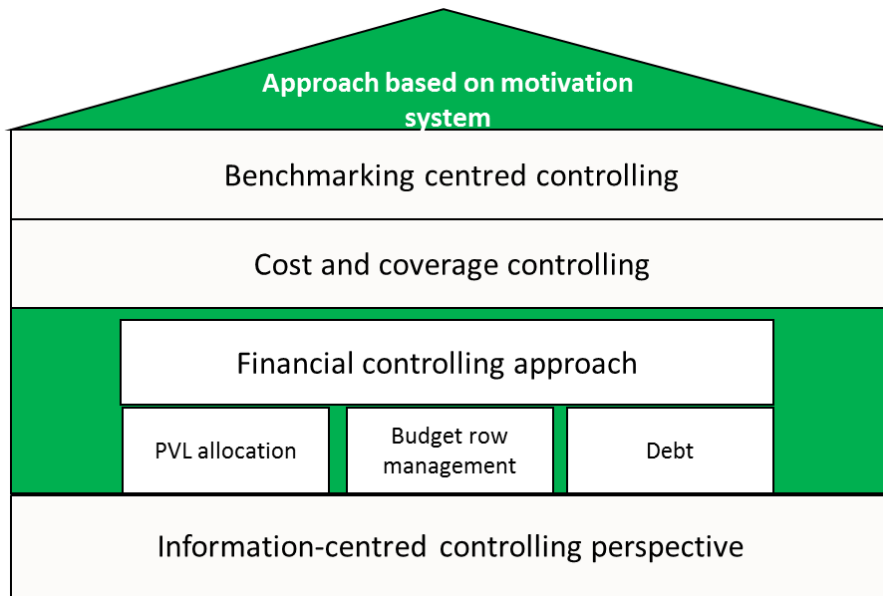
of the financing system. In other words, with the introduction of performance based financing a 'demand of economic fairness' (Molnár - Nagy 1996) and economic stability (Papp 2004) are required and this seems to be implemented in the motivation system based on controlling. After its introduction, this demand – until the initiation of PVL – subsisted since the frequent changes of financing rules and sometimes contradictory policy and owner expectations generate further challenges for health care organization (Papp 2004). In 2004, the implementation of performance volume limit (PVL¹) aimed at the prevention of overspending of Health Insurance Fund incited the writing of some publications, but then a long, quiet period came (2007-2014). Later, some young researchers (Mattiassich 2014, Mattiassich – Bubori 2015, Zemplényi et al. 2014) have begun to publish their studies, but the change came with the SROP 6.2.5-B-13/1-2014-0001 project named 'development of organizational efficiency in the health care system - the development of regional co-operation'. The project was launched by ÁEEK (National Health Care Services Centre, maintenance organization of state-owned hospitals) to increase the operational efficiency of the health care system, which has one sub-target to develop the regularity, consistency, and quality of available management information and decision support system for institutional managers and maintainers. In this framework a uniform chart of accounts, the department and case level controlling methodology and manual has been developed. During its implementations, 51 institutions successfully started the departmental controlling system, and 12 institutions collected cost data of 2440 total cases with the case level controlling methodology (Nikliné, 2016). The national dissemination took place after the implementation period, but its impact is not yet known.

I.6.3.3. Different controlling approaches

From controlling systems the managers expect to subserve the operation of hospitals by increasing the economical stability (Papp 2003, 2004). It is interpreted by different approaches, depending on the context of managerial use: financial approach, cost and coverage controlling aspects, motivation system based controlling, benchmarking or

¹ The PVL is a defined eligible output volume for outpatient care and active inpatient care for service per year, on a monthly. The financing is provided solely within the volume limit by National Health Insurance Fund. Source: <http://fogalomtar.eski.hu/index.php/TVK>

information centred controlling perspective. These diverse roles of controlling are based on each other and support each other in a strong controlling system.



4. Figure: The various approaches of health controlling and their interconnections (Fig own)

Financial approach in controlling

The publication suggests that the activities of most controlling managers reflect a financial perspective, which focuses on the evolution of the debt and on the maximization of the revenue of health insurance funding. At conferences and in the professional media, managers, experts, and health care decision-makers have stressed for a long time and Székely – Bodnár (2004) also write the fact that ‘the current financing system operates with a closed budget and it has a poor connection with the emergence of actual cost’.

Referring to the problems of health care system, Óváry (2014) considers the liquidating of unprofitable operation as the key issue by using financial devices: PVL budgeting based on responsibility accounting. In the context of outpatient care, he points that it is necessary to manage the unutilized outpatient capacity with increasing performance, by which the system contributes to the maintenance of under-financed central laboratory, too.

This financial perspective is very strong in the minds of hospital managers, although a series of publications demonstrate the necessity of costs and coverage information and the possibility of costs and coverage centred controlling system applications.

Cost and coverage controlling approach

Since the introduction of Hungarian Diagnosis Related Groups (HDRG) financing system, not only a number of hospitals, but the health insurance is also dealing with the relationship between tuition fees and actual service cost, but a remarkable segment of health care organizations do not know the relationships of emergence of costs (Székely – Bodnár 2004). One of the central questions of the profession is whether the real cost of health care services is covered by the average costs used in the financing system. According to Zétényi – Csiba 2009, in order to improve the allocative efficiency of financing, itemized data collection should be performed on organizational as well as patient levels. For the clarification of the financing unit, (1) experiences of earlier data collecting methodology of National Health Insurance (better preparation of data collection and various data unification) and (2) the case-level controlling method may be used. The importance of costing is mentioned by several authors but only Székely – Bodnár 2004 elaborates this issue in detail. They use a theoretical approach and do not provide practical experiences, although the consideration of methodological steps might realize an advance in the hospital controlling system. In the Hungarian context, the focus of cost accounting is mainly on the institutional and rarely on the departmental activity; nevertheless, proactive researchers and professionals have already started to elaborate international costing methodology (case-level costing, activity-based costing, process-cost calculation). With the information of case-level cost, (1) the cost and contribution of each health care service can be demonstrated, (2) the cause of deviation of costs can be analysed that may designate such points for intervention which have been hidden so far because of the aggregated form of data, (3) by realizing a deeper knowledge of utilizing resources and by restructuring the processes of providing, efficiency reserves can be exploited (Zemplényi et al. 2014). Thus, the decision-making processes of hospital management can be improved, moreover it provides opportunity not only to assess the types of interventions but even doctors can make comparisons

(Budánovics 2007). Last, but not least, the standardized cost calculation also allows comparison of data from the institutions and to explore the reasons of the differences.

The aim of the cost and coverage analysis is to reveal the mistakes in operation, to give substantive suggestions and therefore to contribute to achieving the positive cover by efficient operation. In order to achieve these goals, accounting and operational model, fixing basic data of cost elements (material, medicine), controlling system and IT support are necessary (Budánovics 2007). According to the practice of Csidei et al. (2005), ‘managers get feed-back about the work completed in each department and its financial benefit monthly, and at managerial meetings they assess the probable causes of difference compared to the plan not only on institutional level but in the aspect of each department, too. Suggestions for solutions are formed on departmental level’. In her interpretation the management has a ‘serving function’: it collects the emerging demands, examines the reality of modification, and elaborates the applicability environment.

The methodology of department cost and coverage calculation is centrally defined in controlling manuals (Bsoft 2015a,b), which gives the opportunity to the maintainer to collect, compare, and analyse data from different institutions, and to clarify the much-discussed financing method.

Benchmarking centred controlling approach

Besides classical controlling functions, Szabó (2003) emphasizes the benchmark as a managerial tool. In his hospital, at least annually, the indicators of capacity, operation, cost, input, and financing are compared with common databases of hospitals using a similar information system. The data of benchmarking give a factual answer to questions debated for a long while: without co-hospital comparisons, regarding a low performance of acute care it is difficult to decide whether there is a lack of human resources or not... ‘Data of performance and staff numbers of similar departments in five other hospitals decide the question’. This type of comparison and analysis function is only mentioned by a few authors, managers hardly use these external and/or internal data to be compared. Benchmark may be produced by three sources of information: (1) national data released on the National Health Insurance Fund (NEAK) site, (2) database,

prepared by external consultants, and (3) own internal data, in case of large hospitals. The NEAK data has a broad scope: monthly, mostly aggregate data about number of beds, patients, or interventions. The monthly financial analysis describes in detail performances in units of region, profession or institution, so hospitals can make conclusions based on this data, at least compared to the average. Reports, made by the consultants, are made on the basis of more accurate and more detailed benchmark data, but they also result in additional expenditure for the institutions.

Approach based on motivation system

The forming and applying of the motivation system enhance managers' and employees' willingness to achieve the targets. Papp (2003) stresses that by introducing a motivation system, 'the management does not only establish an incentive system, but improves the wage-levels and biased wage ratios as well'. In addition, the most important motivational factor is the formation of an active work atmosphere with elements like guide, tolerance, support of professional advancement emotion, feed-back, assessment, justice, and ambition (Krokovay – Kohán 2004). According to Szabó 2003, one crucial element of this system is the modelling of the established construction of interests since in the 'rapidly changing operational conditions of health care organizations even a properly constructed motivation system may cause liquidity problems'.

In the interpretation of Molnár – Nagy 1996, the controlling is relevant in the context of motivation system. The aim of the controlling is 'to keep to direct costs, to increase contributions, to hold the level of contributions, a financial result, to achieve the minimum performance in each area, to meet quality requirements, to continue the change of structure, to achieve the optimal number of staff, and not to inspire revenues from NHIF'. So as to fulfil these goals, the following operational process is necessary: 'bottom-up planning; top-down manager concepts; to freeze staff number; plan bargain, plan agreement, quarterly accountability, defining an interest base related to quarterly performance in each organizational department as well as the free utilization of the interest base'.

Compared to the construction and adaptation of motivation system applied in the for-profit sector it is a huge difference that the incentive of performance is possible only to a defined measure, namely the performance volume limit (PVL), as above this measure, due to the decreasing financing, even the effective management might turn into negative value. Óváry (2014) emphasizes the fact that the controlled and limited performance guarantees the hospital's sustainability. Consequently, the most remarkable element of the balanced financing has been the operation of the mature endo-financing system in recent years (Kecskés 2003), in which the establishing of departments of responsibility and accounting plays the most important role. Departments of responsibility are determined by workplaces being separable in the professional sense on the one hand, and having a manageable size regarding calculation of income and costs, on the other (Szabó 2003). Then on the basis of the previous departments contribution indicators are to be defined. Therapeutic clinics and diagnostic institutions have been interpreted as profit centers so the concerned departments have been interested in both the rise of income and the reduction of operational costs. At Medical University of Debrecen endo-financing is based on the financing of the NHIF but the income of the NHIF is reduced by the proportional part of central costs which forms the basis of clinical incomings. However, the underfinanced clinics and professions (for instance paediatrics, haemodialysis, kidney transplant as well as heart surgery and orthopaedic demanding many implants) have accumulated remarkable internal deficit. In order to decrease this deficit to a manageable amount regarding these areas, moderate cutbacks compared to the average were applied in internal financing systems.

Óváry (2014) attributes the failure of the operating of the motivation system according to contributonal principle to the out-of-date reporting system and he demonstrates it by the example of National Institute of Clinical Neurosciences. In cases of exceeding the budget, sanctions were not taken in the institute, in other words, 'not more than verbal sanctions were applied', and thus this practice has suggested to managers that budgets might not have to be kept. 'It has become obvious that the right solution is the orientation of fundamental goals instead of avoidance even if it is possible at the expense of sanctions, debates, and roundabout, sometimes inconvenient and personal confrontations' (Óváry, 2014). Consequently, the situation has been arranged and the mandates of managers positioning themselves against the rules to a high extent were withdrawn.

Similarly to Molnár – Nagy's (1996) opinion, these examples present that the most significant results of controlling as a motivation system are the change of approach, the intensifying of responsibility, the common application of departmental controlling, the feedback of performance, and cost related data being necessary to rapid interventions and increase of performance of medicinal activity with minimal specific incremental costs.

Information-centred controlling perspective

The core management control is primarily applied as an information providing tool to fulfil the goals of organizational decision making (Strauss – Zecher 2013). Health care managers also focus on providing information and often examine the area in information technology approach (from three important points of view, namely financial, user, and process) (Szedleczki 2003a,b). Information support is a tool for elaborating and analysing data but at the same time it has an important role in economic processes as Sárossy (2002) stresses. Among those the most important is to find the sources of outcome and deficit, to explore the possibilities for resource optimization and the relationship between demand and performance as well as to assess accessible performance. In managerial decision support 'quickness of informing is an essential issue' (Szabó 2003), but slow process time, paper based processes, manuality, and paralelity in registers, outdated/contradictory/incomplete data (Kiss – Stubnya 2006) makes it more difficult in health care institutions. Moreover, information satisfies diverse demands since the executive manager of a hospital is interested on department-level in summarized organizational data or demographic, analytic, and epidemiological data (Polyvás 2007a, 2007b), while a doctor in inpatient care needs data regarding the department and patients (Sárossy 2002).

14 years ago Túhegyi (2003) reported that information systems in health care institutions operated as subsystems not or hardly communicating with each other, accordingly, financial, economic, and medical systems could communicate with each other with difficulties. After continuous development of the systems, the IT support of accounting and controlling area of health care institutions was surveyed for the controlling concept (Bsoft 2015). The bookkeeping is typically in CT-Ecostat of CompuTREND (independent management software, organically adaptable to any

system) or in MedSAPSol of T-Systems (configurable based on individual needs, with specific improvements) integrated economic system. The two major controlling systems are eKON software from the BSoft KVIK family and CT-Medkontroll application of CompuTREND. Both modules are suitable for collection, following, planning, plan-actual comparisons, cost allocation of performance, and management data.

As in the controlling area, the economic (expenditure-cost-income), (medical) professional, and performance data appear, controlling is suitable to fulfil complex data requests – internal or external, senior executive or maintainers – and decision support analysis. A challenging issue of the turbulent health care environment (Dózsa, 2010), constantly emerging for almost 10 years, is the outsourcing of activities of the organization, the most critical point of which is decision planning (Tanács, 2002). Instead of classical controlling functions (planning, control, and information services), the controlling role is often the completion of ad-hoc analytical tasks (such as outsourcing) and the satisfaction of maintainer data requests.

I.6.4. Conclusions and outlook

The topics of Hungarian health care controlling partly cover the areas of business controlling (costing, systems of responsibility etc.), although in a much more incomplete and superficial way. As Túhegyi (2004) mentions, ‘the necessity of controlling always emerges there and then, when and where the external sources of the organization are reduced, and the interest of management aims at utilizing the internal, available sources of the organization in a more rational way’. Thus the controlling tasks and publications come from practice, consequently these publications do not build on each other, the authors do not draw from each other's results, and sporadic works are published. On one hand, very few and typically practice-based researches appear in the health care controlling, on the other hand, research links (networks) are not developing. While doctors follow the international research results at least theoretically, regarding managers this interest is missing maybe because of environmental uncertainty, the lack of competence of management, or even the change of stakeholders. A narrow strata of managers of health care institutions publish papers about their experience and take part in conferences. Publications often concentrate on the popularization of different

softwares and information technologies. However, there are more and more participants at conferences, and interest as well as the motivation for getting information seem to be more intense.

In Hungary controlling has become a core issue with the introduction of performance financing (HDRG) and since then financing has been in focus, sometimes with coverage calculation or benchmark elements. Contrarily, a range of international publications is about the prompt cost increase in health care and as a result, these writings concentrate on the more accurate knowledge (methodology and application of costing) and possible decrease of costs as well as on the results and experience of reforms indicated by the demand for cost control. But Hungarian literature hardly deals with performance measurement although planning is one of the most important elements of management control systems. Planning and plan and actual data comparisons are not in focus, the cause of which is not obvious according to the available literature, nor are the application of information and the decision mechanism of hospital management clear. Due to the turbulent environment of past decades (Dózsa 2010), the managers of health care organizations and hospitals react to changes more slowly and carefully, however, the integrating, the maintenance as well as the available utilization of organizational information would serve as one of the most important tool of management. Instead, the intensifying uncertainty generates an adverse reaction and the solution 'is looked for again and again in the context of performance increase' (Zétényi 2006). The connection of information and decision making is hardly known from publication, although the controller (Dencsi – Varró 2008) has to 'assess the realization of goals established by the management, and has to reveal such narrow cross-sections which may impede the realization of purposes'. The pre-requisite of this is that the hospital management and sector as well should have a well-defined strategy and medium and short term plans which provide the opportunity for controllers to perform the classic controller work.

The controlling thinking of health care institutions has changed significantly over the past two decades. Following the introduction of performance-financing system, controlling is periodically a "popular" area: up to the introduction of PVL it was the subject of professional discourse. In the "PVL-free period", the thinking based on motivation in a manager-based approach/way, coverage calculation, benchmark, and appropriate information support appeared and for 5-7 years it was determinative not just in the life of the pioneer institution. The introduction of PVL and government austerity

measures restrained this control-based management: caused a paradoxical situation, the devaluation of controlling. Despite the continuous decreasing of resources in the health sector, controlling may be a support tool in effective (or less loss-making) management. The strengthening of financial approaches includes faulty assumptions: managers mistakenly believe that the limitation of cost (or even expenditure) could improve the output of the department or institution, especially in an uncertain and turbulent environment. In contrast, the coverage calculations, institutional comparisons reveal potential reserves, show profitable activities, and the building of an organizational motivation system can support achieving organizational goals.

In order to continue centralization and acquire a deeper knowledge of health institutions' operations, the maintainer uses the tool of standardization steps in the field of controlling too: prescribes the application of controlling methodology manual, common chart of accounts, and requires data services. The managers of hospitals and the maintainer may think about sector-wide decision support systems. The mentioned SROP project has shaken the managerial and medical audience and maybe the management sciences can be in the focus again.

As the saying goes in the health care context, 'effective therapy is possible only after proper diagnoses': symptoms are explored which may mark further research directions for health care institutions. In view of the literature, the causes of these phenomena require further researches to which elaboration of qualitative methodology is necessary. The causes of the paradox of devaluing controlling might be analysed by interviews, and the widening of knowledge about these issues may improve controlling in health care.

II. CONTROLLING SYSTEMS OF NATIONAL HEALTH INSTITUTIONS

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The study presents controlling system factors of Hungarian hospitals and their relationship with the structural modelling. The survey includes controlling data of almost all the hospitals, and they focuses on the frequency of controlling activities such as the rate of decision support or information service. The results demonstrate that hospitals' control process is basically identical to literature definition but the variability of elements in intensity can reveal differences in interpretation and use.

SUBJECT: path modelling, controlling, health care.

For the creation of the model, I am most grateful to László Füstös for his professional support and constructive recommendations. Allowance to use the questionnaires was granted by the project SROP-6.2.5-B-13/1-2014-0001 of the Hungarian Health Care Provider Centre. Also thanks to Bodnár Viktória for her advice and support.

II.1. Introduction

The international and national health care management control (controlling) research proves its hypotheses typically through qualitative analysis. Quantitative analyses appear in limited numbers, especially in the context of questionnaires supporting interviews in case studies. The path analysis method applied in this article was used by Naranjo-Gil – Hartmann [2006] to evaluate the hospital management accounting system. In their analysis they observed (1) how to use the hospital top management accounting systems for strategy implementation and (2) how to apply it in professional or management dominance leadership.

Moreover, in medical research – mostly in the field of health behavior and psychology – path modelling is a method used relatively often, i.e. by Ellison [2008]. She examined the relation between perinatal conditions and developmental outcome in low birthweight infants. Dyches – Rushing [1993] analysed the health status of women in the context of global economics. Of Hungarian health researchers, Csorba [2001] used the method for suicidal behaviour, family and personal factor for adolescent girls and Mészáros [2013] for work-related stress among health care workers.

This study examines and settles the controlling system factors for health care institutions in a complex structure with structural modelling – LVPLS² – technique. The publication starts with the management control definition and completes with the relationship between the control elements of hospitals, using questionnaires.

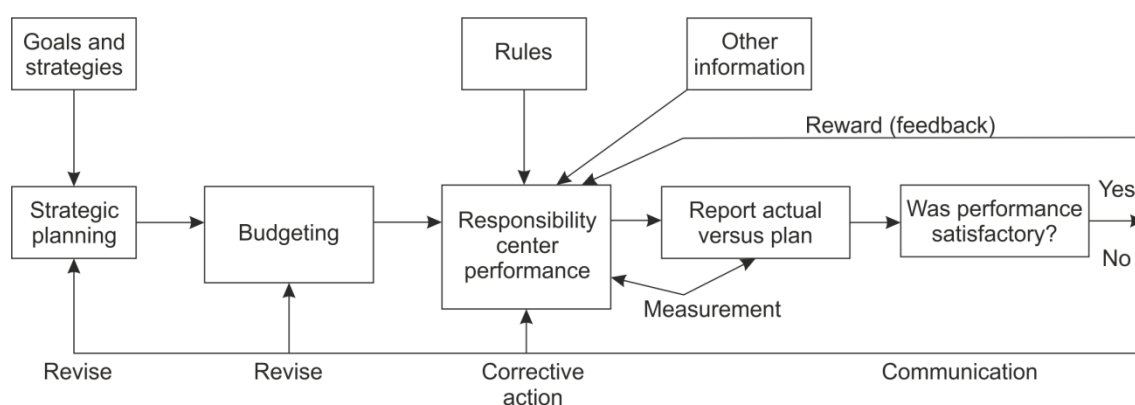
² LVPLS: latent variables path analysis with partial least squares estimation.

II.2. Background of controlling systems

In the health care sector, the increased cost-consciousness could be observed in different degrees and because of the economic downturn the focus on cost is still persistent: cost control and cost containment are emphasized [Chua–Preston, 1994]. In the 1980's management control was rather interpreted as a decision-making tool and the emphasis was on aspects of information required for decision making. Today, management control in the public sector has become a widespread management technique too.

GYEMSZI [2014]³ defined controlling for hospitals in a uniform way: *'in a broad sense, management tool or device for organizational functions, with the task of setting goals, planning, performance measurement, monitoring, and support of information for decision-making, coordination of these activities and substantiation of economic transparency (according to Horváth [1997] and ICV–IGC [2012]). By used definition of controlling, it simplified includes any institutional planning and/or actual data processing and/or deviation of activities in any field of management and financing processes.'* The 'formal management control processes' illustrate management control model [Antony Govindarajan, 2009, p. 112], see Figure 4.

5. Figure: The formal control process (source: Anthony – Govindaraja, 2009)



³ On 1 March 2015, ÁEEK became the legal successor of GYEMSZI.

In the path model, I use the basic elements of control process: planning (budgeting) and comparison and analysis of plan–actual data, both of which are based on the environmental and organizational factors. The relationship between planning and control (plan – actual data comparison) is tested in this context.

The curative activity of health care institutions can be characterized by a high degree of heterogeneity; hospitals provide a wide range of health services (basically not profit-making activities) in several professions and type of care for diversity of patient populations. Nevertheless, the targeting in private sector (establish of objectives and strategies) and the focus on effectiveness need to be followed in the health care system too. Thus the control activities of the two sectors could be similar but the role of the control process elements varies in institutions and on a managerial level.

In my research, I examine if the national hospital management decisions are based on data and analysis; how often the activities and performances of the organizations are planned and monitored and what kind of relationship there is between these activities. I test if the order and the weight of the control element in health care corresponded to Figure 1.

A result of the continuous decreasing of sources in the health sector is that the institutions have to respond to the effects of external environment and it has to appear in the control process. In this context, it would be interesting to find out if hospitals put more emphasis on planning and on what level (institutional or unit) these activities occur.

II.3. Controlling systems of Hungarian health care institutions

The ÁEEK assumed the standardization of controlling methodology within the framework of project no. SROP 6.2.5-B-13/1-2014-0001 named ‘development of organizational efficiency in the health care system - the development of regional co-operation’. At the first step, the current controlling practice of AEEK maintained hospitals was evaluated by using two questionnaires with self-assessment method.

II.3.1. Survey with questionnaire

The data of 'A' questionnaires were used since they aim for the understanding of the basic characteristics of controlling, as well as the identification and assessment of management and controlling activities.

The questionnaire was sent to all institutions maintained by ÁEEK and the number of received and processed responses was particularly high: 90 institutions were added into the survey database. The size of the sample covers the population of health care providers – except university clinics, Medical Centre of Hungarian Army and some small foundations and ecclesiastic providers. The institutions not included in the analysis constitute only 14.5 percent of the number of beds. The results of the questionnaire processing – model based on 85 cleaned records – can be statistically analysed and modelled according to the current controlling processes.

The data reflects the controlling practice for the year 2013, while the survey was conducted in mid-2014. On the other hand in the following year, the change in government accounting was an enormous challenge for the institutions.

II.3.2. Limitation of the questionnaire

The questionnaire was essentially made by economic, financial and controlling experts but statisticians did not participate in the development of the questionnaire. Consequently, the questionnaire did not include control issues that could verify the truth in another logical unit.

Nevertheless, the significance of the survey should not be forgotten: it is the first survey of the controlling practice in hospitals for the purpose of status analysis; to identify problems; and it established the possibility of national sectorial analysis.

II.3.3. Main parameters and variables of the sample

After processing the questionnaires, two variables served for the standardization of hospitals: the regional area and role of the institution. The Health Services Management

Training Centre of Semmelweis University revised categories for the former (urban, regional hospital) and created new – more adequate – professional principles for grouping that ultimately did not become legislation. A total of six groups were formed and used: community health centre, community hospital, national institution, specialized hospital, regional centre and co-centre and multi-profile hospital. Two outpatient care and one nursing provider were left out because their role significantly differs from the role of other institutions. As a result the database became homogenous. The institutions' medical indicators (number of beds, number of financed cases and number of nursing days) have also been identified but the medical role of the hospital is better reflected by the range of professional activities. Table 3 shows the composition of the hospital samples.

3. Table: Sample by role of hospital and regional area

Description	Respondent (pcs)	Proportion (%)
Role of hospital		
Community health center	17	20,0
Community hospital	16	18,8
National hospital	9	10,6
Specialized hospital	8	9,4
Regional center and co-center	12	14,1
Multi-profile hospital	23	27,1
<i>Total</i>	85	100,0
Regional area		
Western-Transdanubia	18	21,2
Southern-Transdanubia	9	10,6
Western – Central Hungary	13	15,3
Southern – Central Hungary	11	12,9
Northern – Central Hungary	15	17,6
Northern Hungary	7	8,2
Northern Great Plain	3	3,5
Southern Great Plain	9	10,6
<i>Total</i>	85	100,0

The questionnaire for hospitals was divided into categories about various details of different controlling tasks. The environmental, planning and analytical variables were processed and encoded using IBM SPSS program.

There were only three nominal variables and these variables describe the controlling environment: asking if the hospital had a controlling unit and/or job positions, if it prepared profit planning in full accrual basis and if it categorizes social security financing by professional departments. The values for these variables are either 0 or 1 (i.e.: no or yes).

The other variables, measured in an eight-item Likert-scale, reflect the frequency of controlling activity:

- 0 – not taken,
- 1 – ad-hoc,
- 2 – yearly,
- 3 – biannual,
- 4 – quarterly,
- 5 – monthly,
- 6 – weekly,
- 7 – daily use.

Appendix IX. 4. contains the variables and labels.

Depending on the managerial needs of information and executive decision support, the distribution of variables is different but most of the variables have no normal distribution (see Tables 2 and 3). Many variables have a typical value of ‘no’ or ‘monthly activity’ that designates an extreme limit.

Controlling – environment. 72 percent of hospitals have a controlling department, and 97.6 percent have some controlling function. The institutions made profit planning (in addition to cash-flow based budgeting) but institutional profit calculation is not identified and divided into the medical professions (departments). The data collection and registry is typically monthly concerning the required variables for operating controlling system (controlling – environment variables). But the sample is no longer uniform– due to the high variance, quarterly and daily frequency of recordkeeping may be significant as well. For example, a total of six institutions were not registered the cost at all, in six hospital in every half-year, 10-11 institutions collect data weekly and quarterly, and the average value (monthly) is in 53 institutions. The budgeting has similar characteristics (a little higher standard deviation) and that is understandable since they are closely related.

4. Table: The nature and frequency of controlling activity, concernant the variables of enviroment

Variable	Maximum	Mode	Mean	Standard deviation	Median	Weight of factors
Is there any controlling department or job in the hospital? Y/N	1	1	0,72	0,453	1	0,66
Do you make profit calculation? Y/N	1	1	0,75	0,434	1	0,78
The NHIF revenue is calculated to departmental codes? Y/N	1	0	0,12	0,324	0	0,20
What frequency is						
profit calculation in accrual accounting aspect (on department or activity level)	5	0	2,85	2,056	4	0,78
collection and recording of actual performance data of departments	7	5	5,14	1,241	5	0,45
collection and recording of actual revenue data of departments	7	5	4,66	1,417	5	0,58
collection and recording of costs of departments (cost centre)	7	5	4,74	1,456	5	0,49
cost rows budgeting on institutional level	7	5	4,44	1,792	5	0,69
cost rows budgeting on department level	7	5	4,57	1,823	5	0,63

Remark: in Table 4-6. the element of scale: 0 – not taken, 1 – ad-hoc, 2 – yearly, 3 biannual, 4 – quarterly, 5 – monthly, 6 – weekly, 7 – daily use.

II.3.4. Planning and control

The average value of planning and control (plan-actual comparison) indices moves around the annual and biannual activities. But because the typical standard deviation is often more than two, in many cases the average biannual or annual frequency planning/control moves toward ‘non-planning/control’ which is supported by the mode indicator.

The planning indicators are the more volatile from the two blocks of variables. For example, a typical planning variable often has big distance between mode and mean and high standard deviation is common. Summarizing, the maximum value of planning gives a good description, which shows that most of the planning indicators do not exceed the monthly rate.⁴

⁴ It is also important to note that the monthly planning is not equal to yearly planing divided by 12 because for example it does not take seasonality into account. Unfortunately, the monthly planning was not defined in the questionnaire.

It can be difficult to draw overall conclusions from the data – only the organizational physical, revenue and cost planning indicators can be typically designed for each month. The data of institutional performance planning (average nearby typical value and median, and low standard deviation) is various: 43 institutions fall into the (monthly) average, 23 institutions used the annual planning, another 12 institutions did not plan and there are only a minimum number of records in other categories. The cost, profit and margin planning in department levels do not operate in such a large number of institutions that even the mean value is ‘not planning’. According to the data the average planning exercise is annual or biannual activity.

5. Table: The character and frequency of selected variables controlling activities, for the planning and analysis

Variable	Maximum	Mode	Mean	Standard deviation	Median	Weight of factor
Variables of planning						
Institutional performance (physical indicators) planning	7	5	3,65	1,831	5	0,65
Departmental performance (physical indicators) planning	7	5	3,23	2,289	5	0,74
Institutional revenue planning	5	5	3,47	1,663	4	0,52
Departmental revenue planning	6	0	2,07	2,243	2	0,57
Institutional cost planning	6	5	3,23	1,723	3	0,61
Departmental cost planning	7	0	1,92	2,218	0	0,78
Institutional profit planning in accrual accounting aspect	5	0	2,37	2,015	2	0,73
Departmental coverage planning	5	0	0,99	1,803	0	0,67
Departmental profit planning	5	0	0,96	1,752	0	0,55
Institutional expected profit calculation in mid-year (prognosis)	5	0	2,12	2,083	1,5	0,42
Case mix index (separating high-value intervention) planning	5	0	0,72	1,567	0	0,32
Variables of analysis						
Comparison and analysis of institutional plan-actual performance data	7	5	4,14	1,920	5	0,56
Comparison and analysis of departmental plan-actual performance data	7	5	3,39	2,425	5	0,69
Comparison and analysis of institutional plan-actual revenue data	6	5	3,84	1,788	5	0,55
Comparison and analysis of departmental plan-actual revenue data	6	0	2,08	2,33	0	0,73
Comparison and analysis of institutional plan-actual cost data	6	5	3,30	1,903	4	0,66
Comparison and analysis of departmental plan-actual cost data	5	0	1,78	2,203	0	0,88
Comparison and analysis of institutional plan-actual profit data	5	5	2,94	2,032	4	0,63
Comparison and analysis of departmental plan-actual profit or coverage data	5	0	1,49	2,008	0	0,80

Analysis of case mix index (separating high-value intervention)	5	0	0,69	1,414	0	0,48
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The control variables have been balanced – the analysis of institutional data typically occurs monthly, departmental analysis is not undertaken and neither is department-level planning. Because of the differences of the average and standard deviation of the activities, I compared the ‘paired’ variables by performance, revenues, costs, results and case composition of planning and control (See Table 6).

II.3.5. Disruption and comparison of institutional and department- level indicators

However the quality of using controlling and management decision-making is shown not only by frequency but the depth of analysis and planning. In this regard the survey examined the organizational level of the controlling activities (institutional, departmental unit). Each variable used in planning and analysis exists in two dimensions: institutional and departmental (i.e.: not only does it consider the frequency of institutional revenue planning, but also the same for departmental planning.

6. Table: Average and standard deviation of planning and control activity

Variables	Average of planning	Deviation of planning	Average of control	Deviation of control
Performance				
Institutional	3,65	1,831	4,14	1,920
Departmental	3,23	2,289	3,39	2,425
Revenue				
Institutional	3,47	1,663	3,84	1,788
Departmental	2,07	2,243	2,08	2,330
Cost				
Institutional	3,23	1,723	3,30	1,903
Departmental	1,92	2,218	1,78	2,203
Profit				
Institutional	2,37	2,015	2,94	2,032
Departmental	0,96	1,752	1,49	2,008
Case-mix index	0,72	1,567	0,69	1,414

The annual and biannual planning dominates: the departmental planning variables rather show the annual frequency. The deviations are always higher than with the institutional variables. The average indicators used in the analysis are higher than the average of planning indicators, which may reflect the importance of the analysis. It is assumed that the managerial decisions are preceded by some kind of information support and the actual data underpins the planning of the next period. The difference in frequency of planning and analysis can be explained by the fact that the planning is monitored more frequently by the institutions. For example the monthly planned data may be compared to the actual data, many times (more often towards the end of the month) for the control of PVL utilization, and in case of PVL overruns the institution/department has the option of revision and rescheduling of the elective care plan. In the case of underperformance, increasing the volume of patients or PVL transfer could also be a solution.

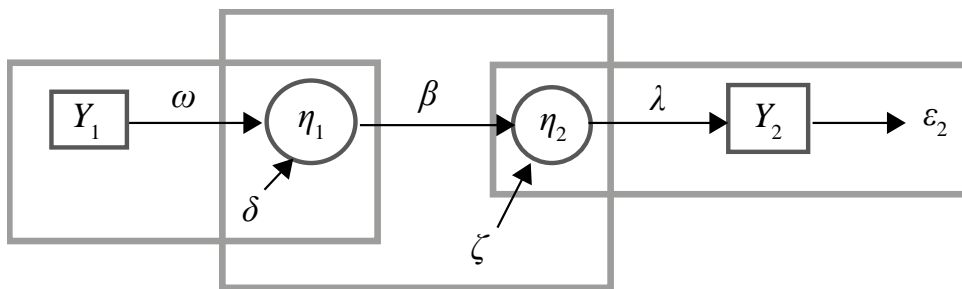
The case mix index characterizes the composition of provided and financed cases in terms of cost. As Table 6 shows, the hospitals do not take this index into account during planning or analysis. This is due to the quite slow changing of the indicator; so once you know its value that could be enough for making a decision.

In addition to the general analysis, separately examining indicators should be interesting, as there are activities that are not necessary to control daily, weekly or even monthly. So 'best practice' is not described by the same frequency for each dimension. For example, the financing of NHIF is based on a monthly report and is fulfilled in the next month, according to the audited data. For the departments the result or coverage is determined exactly at the end of the next month. A more frequent statement will have no accurate information for the class, i.e.: in a long-hospital care activity.

II.4. Presentation of the applied method

The path analysis method is linked to Wright who developed the methodology with the sequential repeating of the regression model. During the path analysis, the dependent (latent) variables cannot be measured so we explain them with the manifest variables. Dependent variables are endogenous while independent variables are considered exogenous. The latter determines the direction of the path. A causal relationship is assumed in the orderliness of the variables.

6. Figure: Depiction of structural equations method [Füstös, 2009]



In the figure of structural equations method, where

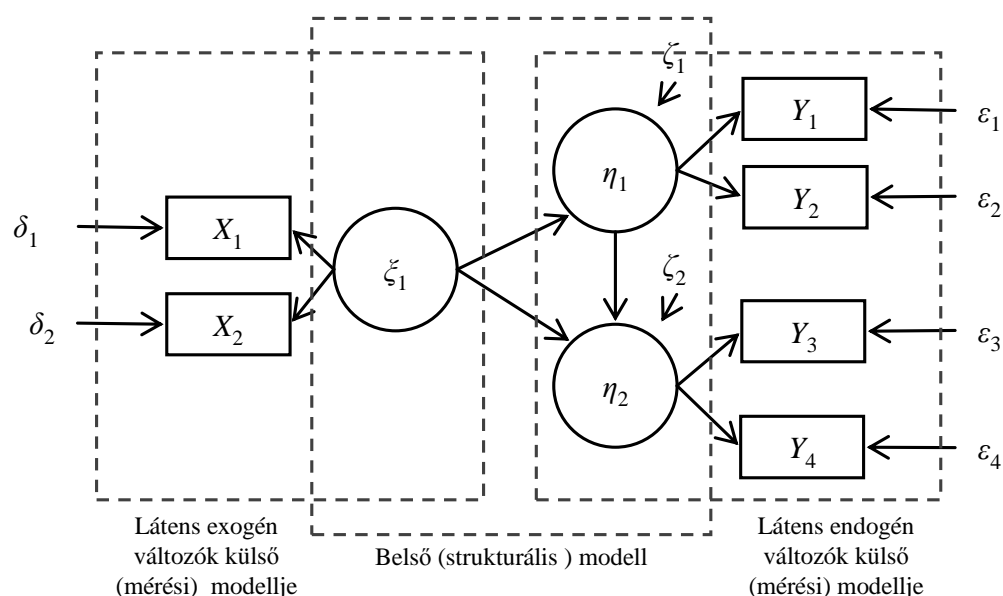
- Y_1, Y_2 – manifest variables,
- η_1, η_2 – latent variables,
- β – path-coefficients(s),
- λ – factor weight of endogenous manifest variables,
- ω – regression weight of exogenous manifest variables,
- ζ – stochastic residual members of latent endogenous variables,
- δ : residual members of exogenous latent variables,
- ε : measurement error of endogenous variables, Füstös, [2009].

Because the variables are not normally distributed and the sample size was more than 100, the partial connections are presented with PLS-SEM⁵. This method is presented step by step in the publication of Kazár [2014]:

- latent variables can be created in linear combinations of manifest variables,
- for the inner model a path coefficient is estimated ,
- estimating latent variables with weight coefficients,
- estimating path coefficients in the outer model.

⁵ PLS-SEM means partial least squares structural equation modelling.

7. Figure: Sematic figure of structural equations method [Kazár, 2014]



The measurement (outer) model presents the relationship between measured and latent variables (X or Y and ξ or η) while the structural (inner) model shows the relationship of the latent variables as the path model illustrates it (Kazár [2014]).

II.5. Interpretation of the results

The environment of planning and analysis was studied with nine variables that reflect the use of the controlling system. The survey was mainly about the data collection and recording of organization and departments, and included management factors (budgeting, profit calculation methodology). The planning and analysis block basically contained the planning and analysis of performance, revenues, costs and results with respect to institutional and detailed departmental units.

The entire LVPLS model is presented in Figure 6. The findings of the model were separated with regards to the inner and outer model⁶.

Findings of the outer model:

- From the weight of environment influencing factor, the NHIF revenues have the least weight due to the fact that they do not distribute them to the medical

⁶The redundancy coefficient is 0,1632, which indicates the verified use of the model.

departments. It showed that the cost driver interpretation of the professions is not common in hospitals. This is due to administrative burden of the data collection of hospital staff.

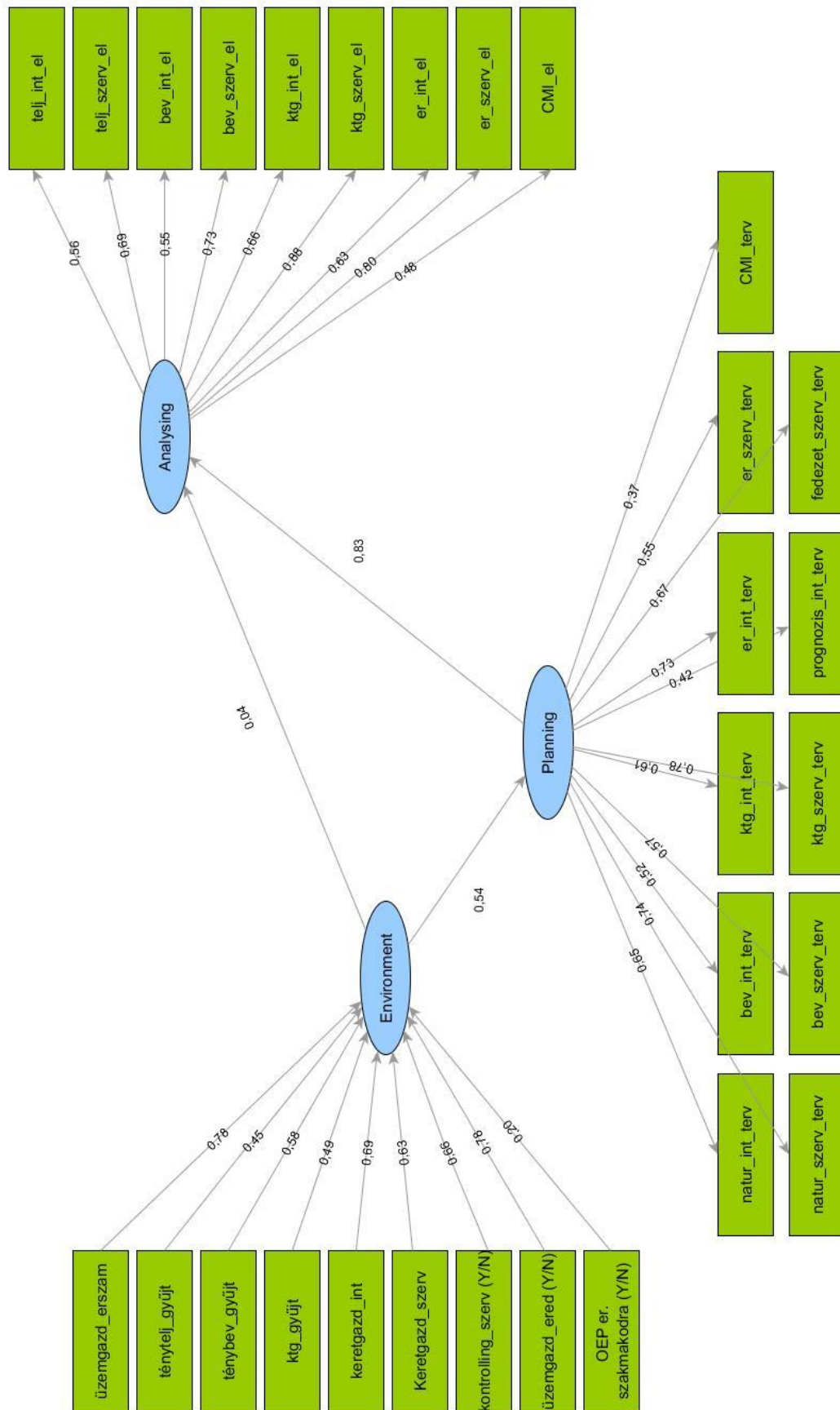
- The variable for department-level performance, revenue, cost collection and register, all of which are essential to planning and analysing, is weaker compared to the strength of other variables. Thus, there are not only operational but also strategic deficiencies in hospitals.
- Examining the factor weights of the two blocks in pairs, planning and analysis of performance have more weight in the model, while in the other dimensions (revenue, cost and profit) the analysing blocks are more emphasized.
- The professional case mix analysis and planning have the lowest weight factor in both blocks and these variables are omitted by hospitals. They either not use them or use them in an ad hoc manner. It is understandable only in those institutions where frequent measurement does not have a positive effect, so the indicator cannot be changed in the short term.
- Note that both of the accrual profit calculation variables (existing profit calculation and frequency of accrual profit calculations) have 0.78 value in the model even on a different measurement scale. This shows the consistency of the model too.

The weight factor of plan-actual data comparison (analysis) is high in departmental analysis except for the planning and analysis of results. (See Table 7)

7. Table: The weight of factor in planning and analysis blocks

	Planning	Analysing
	(factors)	
Performance		
Institutional	0,65	0,56
Departmental	0,74	0,69
Revenue		
Institutional	0,52	0,55
Departmental	0,57	0,73
Cost		
Institutional	0,61	0,66
Departmental	0,78	0,88
Result		
Institutional	0,73	0,80
Departmental	0,55	0,48
Case-mix index	0,37	0,48

8. Figure: LVPLS model for hospital controlling systems (own figure)



The findings of the structural model:

- The controlling environmental factors have no effect on analysis block – we just get a value of 0.04 path coefficient. The planning and environmental connection indicator is 0.54 and the ratio between planning and analysis has a particularly high value (0.83). The model is very strong, based on these values.
- The path coefficients show how different blocks interact to each other. Environmental changing has an effect (54%) on planning and the change of planning causes an 83% modification in analysis.
- The relationship of planning and analysis is the strongest in the internal model: the more frequent is the planning activity of performance, revenues, costs and results the more information is derived from the analysis to support management decisions. This model is a logical structure and is supported by the fact that the controls are operating according to the textbook definition.
- The full impact between analysis and environment (on the path environment – planning – analysis) is 0.49 which is much higher than the direct environment analysis–effect (0.04). This means that analysis is not directly affected by the choice of the environmental elements but it is affected significantly by planning.

II.6. Summarizing and conclusion

To make it transparent and develop the health service management in governmental hospital, the health sector management initiated a hospital controlling systems survey. This is the first step of sector management, in order to build and develop a unified controlling system which may be suitable for decision support of hospital management, as well as to provide data for the statistical data collection system of the sector. The processed data from questionnaires give a strong hint even with the simplest statistical indicators since the whole government hospital service has been assessed. These findings already support that health policy requirement which says that the transparency and consistency of hospitals must be increased.

As a further elaboration, I was looking for a coherent picture of the Hungarian hospitals' driving device, and in particular examined characteristics and variables of control process. It can be concluded, in general, that control process of national hospitals meets the textbook definition. In summary the simple statistical analysis of selected variables has low averages, high standard deviations and extremely high mode without normal distribution. It arises from different interpretations of controlling; and various frequencies in collection of data, record keeping and planning analysis. The implementation can vary even in the same controlling interpretation, because hospitals are themselves different in activities, care form, severity and cost of the cases and last but not least, in management activities and thinking.

For hospitals the path analysis showed that the analysis and planning, including the institutional and department level dimensions both vary in different degrees. Due to the variety of statistical indicators, we may have some inkling that institutional planning and analysis has major importance. (The reason is not known, it may result in the decreasing of funds from the health sector, human resource problems as well, or manager's incomplete or poorly worded demand of information). But the indicators certainly show that setting up a controlling environment in hospitals could be similar and it strongly defines planning and, via planning, analysis too. Planning and control (planned-actual comparison) occurs typically biannually/annually but because of the high standard deviation, in many cases the 'no activity' will also be used. However there have been hospitals, where a department-level planning and analysis gets strong emphasis, encouraging the integrated controlling idea by the owner. The research also

points out that the different time-term planning analyses could function next to each other, and such indicators (e.g.: case-mix index) were also included in the model the collection of which – in specific institutions - is rarely necessary but their identification is.

The elements of the sample have different characteristics so hospitals use different management decision support tools. The model is able to give a typical industry picture but very general statements can be made. With further consideration of the study we have many questions, i.e.: if the frequent planning and analysis assumes an obviously well-functioning system or which institutions have ‘best controlling practices.’

I do not examine the implementation of feedback, use of decision support or the management impact of the institutions due to the limited content of the questionnaire. The relationship between quality of controlling and economic balance shall appoint an additional area of interest – a real change in methodology. The answers to the following questions are not examined through this quantitative methodology but they closely tie in with the topic: do hospital managers need and use the data produced by controlling; and do they use them for their decision? The most appropriate data collection method for investigation can be case studies, interviews or focus group surveys. Combined and simultaneous application of these methods could also be effective, thus facilitating a triangulated approach and reducing the chances of informative selection.

II.7. Integration of literature summary and statistical results

The results obtained with complex statistical methodology (Chaper II.) are confirmed in the literature review (Chapter I). A coherent picture of Hungarian hospital controlling emerged from the two studies made by different research methods. I examined the elements of health care controlling and conclude the followings:

- (1) control process of national hospitals meets the textbook definition;
- (2) controlling operates and develops on individual and practical experiences and so arises from different interpretations of controlling; and various frequencies in collection of data, record keeping and planning analysis;
- (3) health care institutions consider with special attention to the environment and it changes, and chose similarly these indicators;
- (4) hospitals focus on planning and analysis of performance (originating from financing of performance), the financial aspect is very strong; coverage calculation, benchmarking or motivation system are rarely included;
- (5) typically planning of performances occurs in the institutes, the analysis is more dominant in case of revenues, costs and results;
- (6) institutional level controlling activities differ significantly from the organizational level ones and departmental planning and analysis hardly happens;
- (7) the weakness of the systems is the cost collection and planning, but the departmental performance, revenues and cost collection and recording do not or very difficultly work in the Hungarian hospitals.

III. PARADOX OF HOSPITAL CONTROLLING SYSTEMS: RISE OR FALL?

This chapter of the thesis will be published in the Budapest Management Review, with corresponding content and form. Based on this chapter, a paper for the 21st International Research Society on Public Management conference and a poster for the European Health Management Association 2017 was prepared and accepted.

III.1. Introduction

The top managements of health care organizations face unique, field-specific challenges, such as operating under institutional restrictions that are often modified significantly [Kuntz, 2008]. Their framework includes health care financing, limited eligibility of performance, debt accumulation due to underfunding, state supplemental benefits and centralization. These elements have a significant impact on the internal systems of hospitals and on the interests of stakeholders. Present publication introduces the internal controlling systems of Hungarian hospitals, with an emphasis on framework planning. A previous study [Krenyácz, 2015] has demonstrated use of controlling tools in hospitals, and showed that hospital management implements planning and controlling differently both within the sector and compared to the non-profit organizations.

In the institutions performance planning is done; the analysis is more decisive in the case of revenues, costs and results. The institutional dimensions of the controlling activities significantly differ from organizational ones. The organizational planning and analysis displays low frequency and very high standard deviation. The budgeting document submitted for the maintenance is often just to fulfil the obligation of hospitals and the numbers do not assist in managing. The reasons for this can be found in the functioning of health care system and its distorted interpretation. The question is to what extent this health care system will let controlling to be a decision support tool. To find an answer, the following research questions were appointed:

- a) What does controlling mean in the daily routine?
- b) What kind of tools do top managers use for decisions?

c) How does controlling modify operation and decision-making?

After a short contextual section – characteristics of health care and controlling - qualitative research framework and methodology are demonstrated. The next chapter presents the results, and then interprets it and concludes. The article points out the strengths and opportunities of controlling and planning systems, which are advantageous in operation of medical institutions.

III.2. Controlling systems in the Hungarian health care system

III.2.1. Characteristics of the system

The presentation of health care systems has a wide range of literature: regularly issued books, summarizing studies, publications. Thus, in this publication only those elements are presented, which have a role in the interpretation of the results of this research, such as nationalization, performance volume limit and debt consolidation.

III.2.1.1. Ownership: nationalization, as a process of centralization

As a result of the 1990`s health care reforms, central government control has been replaced with decentralization, and local governments remained, with a minor change, till 2012. In this year the hospitals, in many cases with outpatient care units, have been nationalized again. The institutions have moved under a centralized professional managing institution (named GYEMSZI⁷). It has many authorities, such as budget, control and asset management, consolidated public procurement and care management. In the new structure, numerous tenders were announced for top manager positions, and then in 2015 the ÁEEK⁸ became the legal successor of GYEMSZI.

The structural change resulted in a national decrease of number of active beds. Instead of the eliminated active beds, institutions could apply for a one-day daily hospital and outpatient conversion. According to the latest statistics (31 Dec 2014), 168

⁷ Gyógyszerészeti, Egészségügyi, Minőség, és Szervezetfejlesztési Intézet

⁸ Állami Egészségügyi Ellátó Központ, National Health Provider Centre

health institutions provide services financed by Social Security, with the maintainers and size demonstrated in Table 8.

Institutions by maintenance	2014.		2011.		2003.	
	Number of institutions	Number of beds	Number of institutions	Number of beds	Number of institutions	Number of beds
Health care institutions maintained by local government	14	83	112	55.404	117	60.747
Health care institutions maintained by central government	100	58.744	15	6.492	26	9.846
University	4	7.366	4	7.359	4	7.446
Enterprises	24	1.577	12	187	1	68
Religious institutions	9	1.452	7	1.463	9	1.609
Others (foundations, etc.)	16	401	21	592	19	526
Hungarian Prison Service	1	311	2	608	2	608
Total	168	69.934	173	72.105	178	80.850

8. Table: Number of institutions and beds, presented by maintenance (own editing, Source: NHIF, 2014.12.31)

III.2.1.2. Limited performance financing

Health care services are financed, up to budget cap, by the National Health Insurance Fund for Hungary (hereon as NHIF) as central purchaser of services: walk-in patient care based on German points; and hospital care based on Diagnosis Related Groups (hereon as HDRG, Hungarian DRG)⁹ and days of care [Orosz – Burns, 2000]. HDRG system was introduced in 1993 for performance-based financing of the country's whole acute patient care. Throughout the years hospitals got to know financing extensively, and to increase their income they introduced over-coding. However this had to be limited, so in 2004 a finance-cap was set – the performance-volume limit (hereon as PVL). The essence of PVLs is that a limitation is put on the annual performance of hospitals regarding HDRGs, and the NHIF finances care services over the limit only partially, or not at all. To finance over-the-limit performances various methods are applied – some of which can change even in the course of a year. The common performance-stop is part of the financing system ever since due to its capability to lower expectations regarding performance to an extent. Its behaviour however still diverges

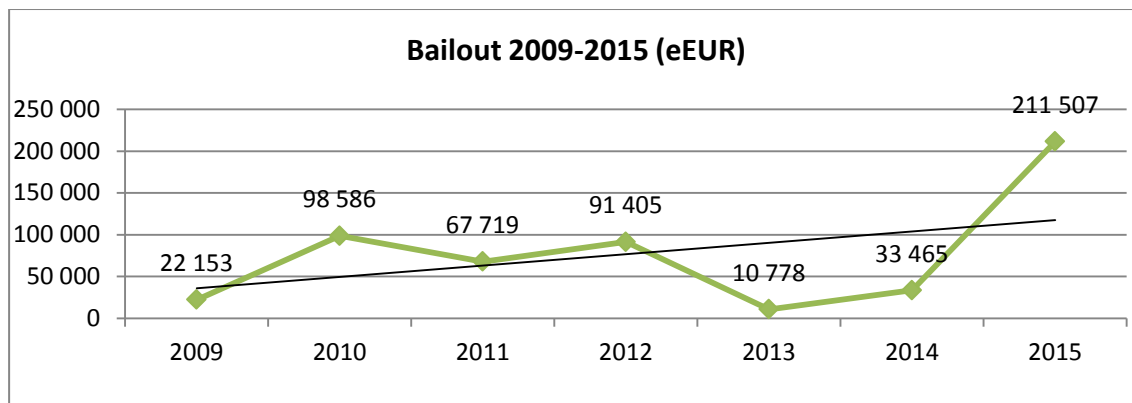
⁹ Similarly to the American DRG (Diagnosis Related Groups) method, financing of acute hospital care patients is based on HDRGs, Hungarian Diagnosis Related Groups.

from across-the-board cuts [Endrei et al., 2014]. ‘Hospitals were forced into difficult situations’ by the limit, and the introduction of many measures were encouraged, such as extending the waiting list or reducing expenditure- and provision-volumes.

III.2.1.3. Soft Budget Constraint: Debt settlement and capital injections as accepted and expected parts of the system

Constant deficit is a problem worldwide and it is due to expenditures rising over incomes. Health care providers do not pay their suppliers and they lobby at the parliament for support even though optimal distribution decisions are not supported by debt settlement [Langenbrunner et al., 2005].

According to the practice in recent years, resources are provided by the financier (later owner) for the settlement of hospitals debts and for the reduction of supplier debt services and waiting lists. However as Kornai [2009] said ‘we are up against a self-inducing process’: if many await saving and hospitals will actually get saved then even more will be expecting the same. Lenient budgets are a state of mind: the decision-maker is waiting to be saved and is acting accordingly [Kornai, 2009]. There was a massive consolidation throughout the entire Hungarian health care sector in 1996 and in 2002 after which the reduction in numbers of hospitals with debts had only been temporary – overspending restarted a while ago [Kornai, 2009]. By now supporting hospital debts has become taken for granted in this system, where hospital leaders expect their pay-out at the end of year.



9. Figure: Financing after accounting for performance between 2009-2015 (own figure, based on data of NEAK)

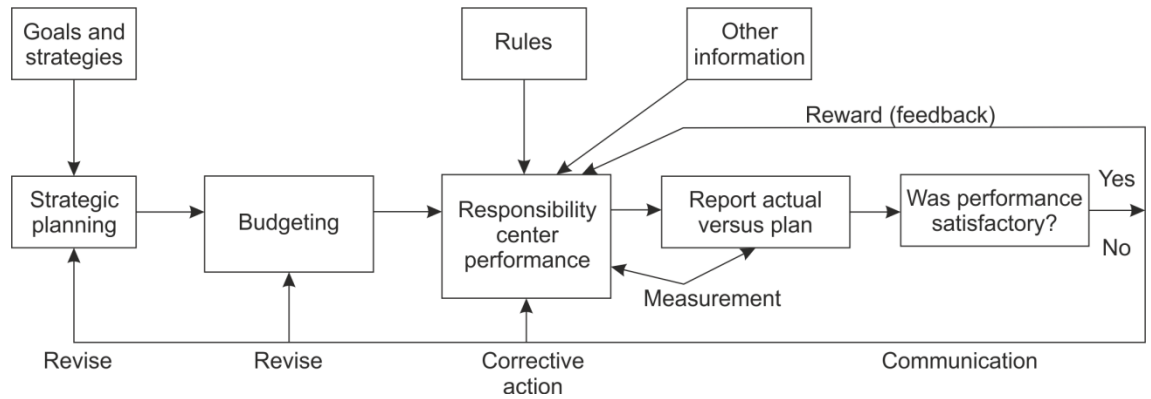
According to Kornai [2009] presence of enterprises is negligible, so in order to set up a more ‘rigid’ budget, different forms of privatization should be allowed. Changes in the Hungarian health care system however occur in opposite directions. Besides, underfinancing could be mitigated by revision of the financing system, structure changes or clearing up problems regarding care types, i.e.: strengthening basic care and walk-in patient care.

III.2.2. Controlling system and budgeting¹⁰

Accounting systems were confined to cost saving and balancing budget; the budget symbolizes the legitimacy of the hospital’s existence and the compliance with government regulations. Thus, managers have limited information about the efficient use of resources [Lapsley, 1994, Pettersen, 2004]. The controlling systems, according to Bodnár’s [1997d] definition, are ‘formal devices supporting management, which serve as planning, measurement, evaluation and feedback for managers on institutional and departmental levels’. Their components are contribution accounting, strategic planning,

¹⁰ ‘Budgeting’ used in international literature is referred to as ‘counting of expenses’ in Hungarian hospitals while they use ‘allowance’ as to list items in the budget, such as medicine, professional materials, etc.

budgeting, operation planning, cost and performance management, reporting systems and analysis tools.



10. Figure: The formal control process (source: Antony–Govindarajan [2009])

Budgeting is one of the most important functions of controlling systems – and definitely the initial one. The broader interpretation of planning uses strategic, operational planning and budgeting, out of which this paper focuses on budgeting as is defined by Anthony – Govindarajan, [2009, 416 p.]. ‘Budgets are an important tool for effective short-term planning and control in organizations. An operating budget usually covers one year and states the revenues and expenses planned for that year.’ In budgeting, which is the fine-tuning of the strategic planning, each responsibility unit is involved because this is the foundation of managerial commitment and subsequent performance evaluation. The controlling systems use the structure of accounting for operation of planning and reporting systems [Baran, 2013, Pettersen, 2003]. A well-designed responsibility accounting system should take into account three criteria [Young, 2008, cited by Baran 2013]: (1) structural criteria – managers are responsible for only influential factors; (2) process criteria –the four phases (programming, operational budgeting, measurement, reporting) are periodical; and (3) behavioural criteria – concerning managers’ behaviour. The operation budgets, planned by responsibility units, are based on resource planning, during which (1) planning of product/service portfolio, (2) planning of capacity, (3) planning of revenues and (4) cost planning occur.

In general, the revenues are generated by HDRG performance, German points and care days, and other possible revenues, costs of production and costs of central administration comprise the budget. Additionally, plan data is supplemented with other quantitative data, such as medical, nursing and other staff capacities and diagnostic capacity.

The cost is calculated based on the amount of health services and specified standard, which is typically the HDRG. In health care the minimum resource demand, defining quality patient care in health care law, must also be considered, usually as a cost-increasing factor. The soul of cost planning is the calculation of costs, which has rapidly developed in the past decade. Its results were i.e.: patient level cost calculation, activity-based cost calculation and time-driven activity-based cost calculation [Vogl, 2013, Blunt – Bardsley, 2012, Kaplan – Anderson, 2004, Baker, 1998, Finkler – Ward – Baker, 2007]. In cost planning, human resource costs, material costs and infrastructure costs (usually divided into medical and other professional categories) appear which is illustrated perfectly by e.g. Vogl [2013].

As all organizations providing services, hospitals also have a direct impact on the patient to be treated. Nevertheless management still do not exercise control over the use of organizational resources [Thompson et al., 1978.], even though knowing the provided services, patient or HDRG coverage all allow the prioritization of economical procedures and keeping the budget inside government framework.

The criticism of traditional operation planning is that it forces the organization into constantly keeping reserves; it generates internal games, affects innovation in the wrong way and is time-consuming. Moreover its use is questioned due to the long planning period [Kresalek – Szörös, 2010]. Thus, the methodology of hospital budgeting is more sophisticated and the emphasis have moved from the financial perspective to the provision of cost information needed for contracts and price negotiations. [Lapsley, 2001]

III.2.3. Historical formation and development of hospital controlling systems

In Hungary, Health Services Management Training Centre of Semmelweis University started to train health care managers for management sciences in 1996. The training plan was created by a group of young professionals in a five year long intensive development work, which was based on experiences of North American and Western European (Dutch and English) experts and universities. It was financed by the European Community TEMPUS Fund. As of 1993, three pilot courses were launched, with support from Hungarian, English and Dutch consultants and Professor Robert Gosselin as well. In addition the World Bank supported the creation of a health management school, as per the framework of the health care transformation program (1993-2000). Due to initial results Semmelweis University became the site of the school. Currently there are three universities for health care management education: University of Debrecen, University of Pécs and Semmelweis University. Controlling is a part of the curriculum from the beginning of the manager training.

Simultaneously, experts returning from abroad after the regime change started to think about controlling systems with open-minded hospital managers. The first controlling system was introduced in 1993, in Zala County Hospital, which started, as well, the first hospital quality assurance (ISO) projects in the country. The first five years was a trial period of hospital controlling systems with the development of the first controlling software (in Pándy Kalman Bekes County Hospital). Since the early 2000s, due to the improving results of pioneering hospitals, controlling and motivation systems massively spread till the introduction of PVL. During this growth period, institutions implementing controlling and/or motivation systems carried out future-oriented planning and analysis of plan-actual comparison in order to increase performance and revenues.

Over the past 20 years, many changes have occurred in hospital environments: nationalization, changes in financing, transformation of bookkeeping methods, merges of hospitals, changes in leadership (as shown in Chapters III.2.1.1-2.1.3). These changes have affected the management tools and have generated a need for standardization in controlling methodology, too, which began to be realized in the years 2014-2015. To develop the health service management in governmental hospitals and to make it

transparent, the health sector management initiated a hospital controlling systems survey. It was evaluated with simple statistical and structural modelling techniques [Krenyácz, 2015]. The results showed that for hospitals the planning is important to different degrees: institutional-level planning is practiced with annual, bi-annual frequency but due to the high standard deviation the ‘no planning/analysis’ value can also be typical. In some hospitals, performance and revenue planning on department level can also be realized but patient level measurements hardly appear due to the insufficient cost collection (as an administrative burden).

Simultaneously, the owner of the nationalized institution has established a statistics data collection system which aims to serve with information about health care supply network for each institution, types of institutions or different areas even. At institutional level the target is to provide adequate information to support management decisions.

III.3. Methodology

The operation of health care institutions is influenced by many organizations and/or individuals who can contribute to achieve the goals. These are summarized in the following figure:

Primary stakeholders	Secondary stakeholders
ministry, politics, state secretary of health	Top management
maintainer/owner (AEEK)	Middle management
local governments	Decision support (controlling, financing, public procurement...)
agencies for financing (NHIF, private insurance)	Physicians
authorities	Nurses
international organizations, social organizations	Other staff
experts	
suppliers, 'creditors'	
'competitors'	
media, press	
patients, others service customers, advocacy organizations	

11. Figure: Stakeholder model of health care institutions (own figure)

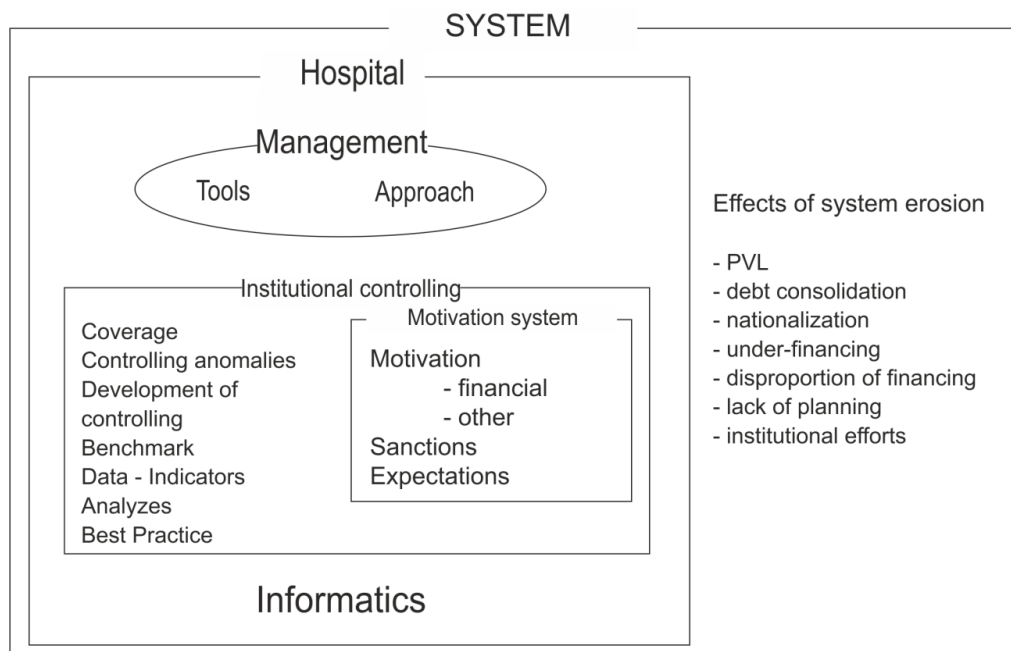
The focus of my research is at the institutional level: interpretations, tools and daily practice of the controlling and planning system and their incorporation in decision-making were all examined. Therefore, from the model, the middle managers, top managers and decision supporters from secondary stakeholders and managers of the owner from primary stakeholders were included. A total of eight personal interviews were made with managers of hospitals (citation with MI notation) and 3-3 with experts (EI) and owners (OI) alike plus one homogeneous focus group interview (FGI) with decision supporters. The interviewed top managers of hospitals were typically from ones with a large number of beds but the diversity in the use of the controlling system was taken into consideration. Three NHIF-financed but profit-based enterprises were interviewed, two of which are state-owned.

The focus group was small (6-8 persons), as the interviewees have experience from several institutions. Moreover, they are highly motivated and committed to managerial decision support. Characters of the focus group:

- homogenous group with two represented areas (finance and controlling), which are closely linked;

- participants have experience from various hospitals (different location, size, structure, management);
- dedication and forming strong, definite opinions have all been assumed based on the questionnaire;
- open and inquisitive team, but with participants typically women (this may be true in the profession as well).

During individual and group interviews, semi-structured interview situation was generated and ‘technique of funnel’ was applied – structure was increased thus using the advantages of strong and weak structured questions. In addition, additional questionnaires were used before the focus group discussion for better understanding of the research topic and the respondents' views. The interviews were built on each other: starting with expert interviews (1.5 hours) followed by a focus group (1.5 hours) and maintainer interviews (0.5 hours). With the expansion of this knowledge, the interview questions of hospital managers were specified. The interview time was initially 1.5 hours then 1 hour. The interviews were typed and after having read them several times a quick report was prepared to keep as a guideline during the final analysis.



12. Figure: Categories used in the coding (own figure)

Based on the text from the experts' interview major categories were marked with open source coding in Verbi MAXQDA 12 software, and then these were divided into subcategories during the encoding (axial coding). I returned to the initial coding, as long as new categories were not introduced by the re-encoding. For checking the coding infracoding¹¹ was applied. The categories of coding are presented in Figure 11.

III.4. Results of the research

III.4.1. Methods of hospital management

Basically, the managements of AEEK-owned hospitals pay attention to the use of scarce resources and to the cost-effective distribution of the funds. Concerning operation, the management systems and the knowledge of top managers are already very heterogeneous. According to the surveys before nationalization operation controlling systems were present only in a few institutes (30%) but that increased to nearly 70% in 4-5 years [Krenyácz, 2015]. However managers still choose different tools to manage hospitals, which are summarized in the following table.

0	No controlling system: leader manages from 'heart-pocket-booklet'	category from experts' interview, 'managers do not like to admit'
1	Special financial tools: liquidity and debt balance, special budgeting rows monitoring and PVL allocation	very typical, almost every interviewee mentioned
2	(operating) controlling system	used by few institutions, typical before introduction of PVL

9. Table: Sumarizing table of hospital management (own table)

¹¹ I recoded the same text in a few days.

0. Managing from ‘heart-pocket-booklet’

The management is formed specifically in many institutions. Some of the managers do not apply decision support systems – information is in the head of the top manager. According to the interviewees who cannot or do not operate controlling systems well, managers have the need to use controlling data but due to personal, IT, validity (most importantly in terms of cost) and/or other problems they do not use them. Experts however also added that:

‘At many hospitals, I can see the leader managing from ‘heart-pocket-booklet’ and it would be difficult to say how many - obviously top managers do not readily admit that ‘of course there is controlling ... in certain areas there are calculations and data...’ but with a lot of improvisation.’(EI)

This kind of leadership can be due to a lack of an IT system and/or the knowledge of the manager, questioning of data validity or to the decreasing ‘room for manoeuvre’ and, consequently, to the decreasing internal role of controlling systems.

According to several interviewees, the reason of managing from ‘heart-pocket-booklet’ is the underdeveloped IT systems and the lack of data validity, but this management style is generated by the lack of managers’ knowledge and the importance of ‘leadership status symbol’ (MI).

‘The manager manages from booklet because they do not have management science knowledge, managers vein or not aware of what he/she can do.’ (MI)

‘The manager is elected politically and this is the symbol of power and status honor ... „he/she is engaged on the base of power and not value’ (MI)

‘For the general director, the main motivation is the status’ (MI)

‘With applying controlling system, not only the fault of organizational operation can be discovered, but it shows the managers’ mistakes as well’. They can only be corrected by exploring conflicts and tensions. It is difficult to estimate the consequences of undertaking conflict, e.g. a decision could paralyze the operation of hospital, and can even affect the top manager status.

'the medical staff itself is actually operating wrong when it is not working as an organization ... for example it took me three years, to achieve that the consilium really could work according to the intended purpose.' (MI)

'after defining the expectation of performance, 40% of physician left the hospital' (MI)

The cause of this type of management, concerning the health care system, is the decreasing of managerial room for maneuver and so the devaluation of management device. The introduction of the chancellery system to health care reinforces this process by 'argue the responsibility and competence of general manager' (MI). It also carries the demand of management and controlling activities, because these are institutional management support devices. The sectoral level management device is currently not solved because of the deficiency of IT and human resources as well.

1. Use of special financial tools

The majority of the surveyed institutions use specific instruments to manage the economic balance:

- (1) liquidity and debt managing: financial processes are reflected in handling of bank accounts and settlement of debts in accordance with the principles, the financial director monitors the cash balance on a daily basis.
- (2) special row budget divided to departments: hospitals manage costs and expenses typically with special budgeting.
- (3) PVL divided to each department and its continuous control: PVL divided into departments and its continuous control activity, in case of difference immediate intervention. This is the most important financial tool with effect on liquidity and debt.

Performance volume limit as a specific phenomenon of the Hungarian health care

The hospitals could account their performance until a fixed amount in the budget: the social security financing revenues are maximized at the beginning of the year. Therefore, the available performance (and so PVL) of hospitals are divided into professions, as PVL 'quota'. This restriction of funding requires the limitation of

hospital performances in active and outpatient care (with the exception of some major illnesses and chronic care.). Managers can reach the maximum financed revenue by continuing controlling and reallocation institutional PVL. This mechanism is largely explained by the strong revenue focus of hospitals: in this context, the main managing role is to achieve the maximum. And so the reported performance to NHIF is always monitored:

'Rule of thumb: make as much performance as is needed to achieve the corrugated PVL ... of course it is a bit more refined ... '(MI)

'They are able to define the gap above the level of PVL, where it can perform without much deficit. Obviously, they can find interventions in the narrow digression gap, which is to cover the fix cost and it is worth to perform. But, above the gap, zero percent financing guarantees the deficit. The question is: how much is the deficit? Because of interest in patient care ... we provide care to patients, free for some, and, if we balance well, the hospital won't be bankrupt. '(EI)

To the listed management tools (liquidity and debt management, PVL and budget row control) the controlling system can be added but the emphasis of elements depends on the managers` use of controlling:

'There are some committed leaders who take it seriously and want to work with it ... '(EI)

'... The wider controlling repertoire is built on management tools, even if it is used only periodically, less frequently, with a delay ... of even half a year.' (EI)

III.4.2. Controlling, as hospital management device

Controlling, according to concordant **definition** of the respondents, is basically an approach, an analysing method of the organization. In the thinking of public hospitals, controlling is a tool for retrospective analysis, not for providing rapid response; practically its tasks are rather the registering and processing of data than the planning, forecasting and feedback.

III.4.2.1. Controlling, as financing device

In addition, the decision support or controlling unit often ‘merges’ with the **finance** departments or in smaller hospitals one department/person does these functions. In the beginning, the controlling tasks were connected to financial functions.

‘controlling is – in public mind – a unit that have to deal with NHIF’ (MI)

‘in the hospital sector, controlling has a function that exists nowhere else: the calculation, collection, revision of revenues and sending to NHIF is here, and then when hospitals need to be contacted (for guarantee issues, etc. per se) Controlling does it. ‘(FGI)

The controlling units are usually developed from departments dealing with financing:

‘When controlling appeared in health care, only the financing unit understood the essence of controlling ... the controlling comes from financing, which did controlling for a long time. This is why controlling and financing are merged in many institutions.’ (FGI)

‘Traditionally, it was created to prepare monthly reports of NHIF ... that was a big stunt to do well, and in time, informatically correctly and considering changing legislation.’ (EI)

Nevertheless, not only the tasks related to financing are done by controlling, but also all sorts of other analyses, ad-hoc tasks for managers and owner:

‘financing, PVL, all kinds of decision support (return on investment calculation, project set up), the co-payment rules, all that is HUF ... are done by controlling.’ (MI)

Based on the interviews, the coverage calculation and the capacity planning were identified as related to the classical function of controlling.

III.4.2.2. Controlling, as device of coverage calculation

According to a number of managers, controlling basically is linked to accounting and coverage, while other managers identified its tasks as profit/coverage calculation. Controlling system receives data from accounting system. In principle the revenues, costs and coverage data are available for each type of profession, care and for each physician. To establish an appropriate professional portfolio and economic stability, more hospitals produce profit calculation on department level (although cost elements are often uncertain).

'The main problem is that there are so-called high-paying professions such as oncology, which feeds the institute well'(MI)

'departments with highly variable cost (ophthalmology, orthopaedics) were cut back or waiting lists have evolved ... it is much easier to produce the same HDRG with 20 patients from the internal medicine department than 3 patients from traumatology. It is cheaper for the hospital due to the less variable cost.'(EI)

In addition to the departmental profit calculation, in a few hospitals the product-level coverage calculation is also represented and the coverage of medical cost centres is rarely determined. Due to the use of detailed coverage calculation it is possible to give feedback to doctors and to make simulations or modelling to answer the question: 'what coverage will be caused by the change in composition of interventions?' And this slowly appears in the minds and attitude of physicians:

'those who does not see these amounts say they just want to bring a new intervention in, and that it will be certainly profitable ... But then they have to add all costs. No, he would not think that way... So if you do not involve professionals then they have no idea what it means economically.'(FGI)

In the public hospitals this type of coverage calculation and feedback is rare; the monitoring of budgeting drug costs and professional material costs is more emphasized. Where there is strong coverage approach, they consider that 'there is sufficient demand' and 'it is financially worth to produce' the specific services. Coverage level 1¹² and

¹² You get Coverage level 1 by withdrawing direct expenses from operational incomes. You get Coverage level 2 by withdrawing indirect expenses from Coverage level 1. You get Coverage level 3 which is the

Coverage level 2 are considered very important and determine the number of planned cases. With the report of case coverage, the physician receives an individual statement above a certain amount. In addition, the report can be used for comparison between divisions, clinics, departments and can be discussed in monthly, quarterly, bi-annual meetings. Knowing coverages does not mean that the operation of hospitals is only decided on a financial basis and ignores the obligation to supply, medical ethics and professional development.

'There are also cases that are not or just partially financed by NHIF but we deal with them because we learn a lot from these.' (MI).

'We decide on a professional basis but we tell decision support: 'Had you missed those two cases you would by now have had 15 million HUF surpluses, and had you done it every month ... 180 million HUF would have been enough for a 20% raise to everyone. Nowadays surgeons undertake less and less quasi-pointless operations. We do not ask them not to do it but we ask if they knew this is a problem.' (MI)

'On the other hand, we often undertake professions with bad coverage because they have an effect to keep and attract patients.' (MI)

III.4.2.3. Controlling, as device of planning and control of capacity

Development of capacities is based on knowing the coverage. Knowing the coverage and other financial and non-financial factors, the capacity can be determined and maintained for the appropriate professional portfolio.

'Based on the basic data, we design a composition of cases, from which the operations and capacity (doctors, nurses, beds, operating theatres) were planned. We have no status but there is business. Therefore, everything could be calculated: HDRG weights, fulfilment of PVL, number of beds, time or nursing

result of operational cost accounting by withdrawing central expenses from Coverage level 2. You get Coverage level 4 which is the result of operational cost accounting corrected by amortization by withdrawing the amortization cost from Coverage level 3. Coverage level 5 is the result of operational and extraordinary cost accounting corrected by amortization and you get it by adding together Coverage Level 4, profit and the extraordinary result. (source: Methodical handbook of case-based accounting)

staff needed. In health care, this can be planned at this level if you think about it.
'(MI)

'You can fine-tune the capacity according to professions, types of interventions and demand. The big question is how much can you 'urge the GPs and control systems? If the wait is too long in a profession, that's wrong, the controls have to be reduced. Then I need to see what kind of portfolio I compiled. I know the profitability of professions and their capability to make profit. I can change the professional portfolio accordingly.'(MI)

'There are very serious capacity controls and we annually 're-set our clock'. Once in every year, our capacities are completely redefined. In previous years 15-20% of the capacity was modified, today only 2% ...The professional portfolio is annually changed by 1-2% and regrouping is carried out between professionals and divisions. '(MI)

III.4.2.4. Controlling, as device of budgeting¹³

The cost planning in health care has a special meaning, disregarding from the classical definition of budgeting. While the hospital budget is continuously decreasing (the budget of year 2012 has been reduced by 15% and this has not increased ever since), the hospital manager has to minimize some variable cost row.

'A very simple and very obvious system has spread in health care: a cost plan for material costs, primarily for professional material costs, is operated. It could be extended, of course, to diagnostics or numbers of employees but pharmaceutical cost plan or professional material cost plan are regularly specified ... as the only perceived regulator for cost of the departments. Because they think that purchased services are minimal, they don't like changes in diagnostics...' (EI)

'The management of cost row budgeting means that the annual expenditure budget is set for each clinic and one of the main tasks of controlling is the follow-up and continuous modification of these budgets, adapted to clinical performance.'

¹³ This budget is dedicated to special cost, the budgeting activity is expanded only for the definition of this cost row.

If one clinic underperforms, controlling reduces the cost budget proportionally to the underperformance and provides budgets to another, outperformed clinic to finance additional expenditure. This is a daily task, in addition to project-based annual budgeting, which is more than enough for controlling. ' (MI)

There are many types of cost plans, according to interviewees, which can keep the financial management of departments under control: professional material, medicines, blood utilization, and laboratory and CT budget. There could be purchaser and user budgets as well. But these budgets are approx. 20% of the total hospital budget and the budget associated with the use of direct patient care cost (e.g. blood and medicines) is more flexible than the other.

'To tell the truth, even the budget is not a budget; because it may be exceeded, with perhaps an awfully confusing administration belonging to it. ' (EI)

'In principle, the department could not exceed the budget, but in health care it is very difficult to keep to it. If a department runs out of medicine, I can only ask to tell me why. It is so infantile. ' (MI)

Cost plans are modified several times a year, according to use and needs. Their function would be to efficiently limit costs but patient care regularly overwrites this. The essentials for the budgeting process, according to the definition, are that the head of department and top management agree with the criteria of operation and they keep to it. In case of hospital budgeting, there are no agreements and negotiations, and due to low hospital budgets, the budget rows are unenforceable. The setting of the cost plan and its management varies between institutions.

'it is generally divided for departments, down to each month ..., and is often interfered with even through the year: it is either brought down or let open. It is regulated by the consumption of the materials too. ' (EI)

'Sometimes it is very hard to define the budget. The department receives an amount of something, for example 10 pieces of hip replacement, within the budget ... those who are pros in this, deliver their expected performance every week or every 10 days and get their spent money back, and then they modify.... (EI)

The characteristics of the 'best, hardest' system are monthly, bi-monthly meetings about spending (budgets, performance of the previous month, extraordinary budgets, changes compared to usual budgets, reasons for changes, reserve budget and its decreases).

'Even with those who operate such a structured system ... the system is still not profitable' (EI)

It should not be forgotten that cost plans are 'only 20% (or even not as much) of the entire hospital budget'. However managers attribute great importance to it because they think that the salaries and central costs are very inflexible and they cannot save in these fields.

'you cannot control overtime, replacement, leave, where the money leaks ... There are hospitals where the overtime is specified in advance, but ... I cannot tell you how many patients arrive in the next month, therefore, it is not possible to ask ... but if they plan on the basis of empirical data, then they will use it because it was authorized. There are absolutely no managerial options. '(FGI)

The uncertainty, legislative changes, continuous re-planning and under-financing generated the marginalization of classic budgeting function. These are much larger problems than the existence of a performance volume limit.

'In the past decade, if financing changes happened only three times a year, it was a quiet year. It is not worth planning because there are heavy uncertainties and no future information. ... those who previously planned also give it up because heads of departments could not plan more than once a year, and without them department-level planning is impossible. '(FGI)

In many hospitals the planning element of controlling systems is defined as special material cost planning and cost of the exhausted personal status. The salary elements of the overall budget can reach 60-70% but budgeting and financial management is not done. The budget contains the amount calculated by the legally required minimum conditions. The material budget is a small part of the total hospital budget but that does not provide any other opportunity. However,

' the use of the budget row control is a very big mistake of the public hospitals because the most important is the optimization of PVL. For this they would have to know which product brings in the most profit'.

The management of cost plan is presented by the phenomenon of PVL and soft budget constraints, and it is continuously fed by ever-shrinking economical fields and opportunities. Before the introduction of PVL, many hospitals used classic planning; they planned revenues and expected expenditure on the basis of performance and capacity.

'In [hospital], we did budgeting dividing it by departments/physicians/ICD groups/diagnoses ... with doctors, for example: with pneumonia by observing number of cases, use of medicine or diagnostics on the basis of historical data ... and we analysed on department level and then did the departmental plan.' (FGI)

Thanks to the classic planning, those hospitals, who heavily relied on the controlling data (most importantly on coverage calculation), have been able to manage successfully. However construction and operation of motivational systems were the most definite pillars of the controlling system.

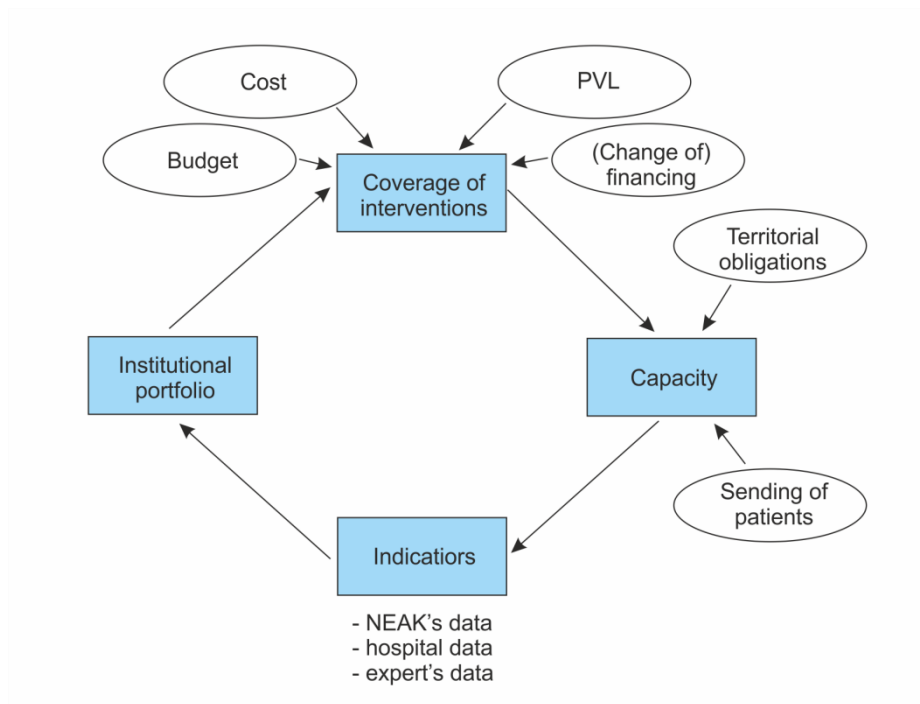
From the controllers' point of view, management of cost plan has essentially a negative impact on management although leaders use it against the budget overruns as the only tools available.

III.4.2.5. Controlling, as artistic device for coordination the whole system

In the hospitals applying controlling functions it became a routine to handle planning and analysis tasks, and so they see that it is always challenging when some changes are made. These changes are managed by controlling/financing, as the primary decision-support because the problem often originates from changes in financing or from disproportionate financing. The system is complex, for which it is necessary to recognize and continuously monitor capacities, coverage, defined indexes and their consistency. On the face of it, the formula is simple: selection of well-financed and covert procedures, setting capacities and tracking indicators. However, many professions and thousands of procedures form a complex system.

'I have to look at what portfolio I will compile, I have the coverage data of professions and accordingly I can set the professional portfolio: what is worth to increase' (MI)

'But like every hospital and institution management ... the essence is to adjust the capacities if you are not good at your capacities, then you will lose.' (MI)



13. Figure: Kontrolling eszközök művészi összehangolásának kihívása (own figure)

But it is not enough to know the coverage of procedures, because even the "side effects" of a loss-making medical treatment can be the use of a profitable procedure or treatment of a patient and the subsequent treatment of another problem can also be economically effective for the hospital.

'The biggest feat is to keep well-paid professions too, like endocrinology, internal medicine (utterly unprofitable) because they attract and send patients onto radiology and ultrasound, which are profitable – that is how you balance. But like any institution or management ... the point is setting the right capacity – without it you're lost.' (MI)

As with music, you need composers to create it, so you need a controlling team to set things right: 3-4 well-trained personnel, equipped with organizational skills and educated to the highest level, who are suitable for any kind of decision support in a hospital, i.e.: HR analyses, preparation of impact assessments for reorganizations, reports on efficiency, etc.

'A good controller is proactive. They have to know leadership targets ... essentials of operation and the company values because everyday choices are derived from those values. ... Be 'near the fire', participate in creating goals and shape them along those values. Be proactive: while 'living and breathing through data', understanding tendencies and the full context propose ideas on how to save, where to intervene. ... In much of the cases the opportunity to intervene in a case depends on their reaction time. If controlling is too slow and retrospective, it will not improve efficiency.' (MI)

'A controller is terribly important. They are, more often than not, invited to meetings, even just to sit there and say what they see fitting. Many times we ask them not to merely quote data but also to analyse them ... what the business mind sees in them. ... In my opinion a controller with 5 to 10 years' experience behind them could change the world.' (MI)

Besides the importance of the controller's knowledge and commitment it is also essential they should be accepted by management and their relationship should be based on trust.

'Let them talk ... When a controller becomes 'fully functional', then they can provide to the head of department, on one hand, and a mutual trust is formed, on the other. They become creditable and trustworthy. Heads of departments not only get answers but new impulses as well (i.e.: which departments need to be examined this month), which can be discussed during weekly management meetings.' (EI)

If there are no controllers available or, as an additional service, external advisors are drawn in, then operation is reduced to optimization of financing and analyses based on external benchmark data.

III.4.2.6. Controlling, as „Jolly Joker” function

Currently, controlling is a retrospective analytical tool, instead of the classical controlling function it is the ‘Jolly Joker’ of the health care institution. He/she performs not only the tasks of financing and controlling, but also all kinds of other analyses, ad-hoc tasks for managers and maintainers. The controller has become a key player with a priority function, it can lead analytical, data service and any tasks to management:

‘Everything that is about money is passed to controlling’ (MI)

‘From financing, from PVL, from all kinds of management support (investment-return calculation, project writing), preparation of the fee for service policy’ (MI)

‘Perhaps because of numbers... and who is the one who work with numbers in the hospital? That's controlling! I think it's a bit wrong to be classified here as well ... even in my 4-person class, 1-1.5 person was dealing with core controlling.’ (FGI)

Data from the maintainer cannot be automatically answered by the hospitals, data collection and evaluation is usually carried out and controlled by the controller.

‘For example, if we had to make decisions about human policy, we made the analyses ... the basic idea, the baseline analysis of what we would do if we did this was always on our side.’ (FGI)

Hospital managers refer to controlling the decision supporting tasks based on data services and calculations, while the controlling department has the knowledge to perform the task. The economic department provides financial and economical tasks engaged in economic activities and involved in the preparation of the budget report, in the regular reporting for external organizations. In most cases, ad-hoc data requests or internal task scheduling, coordination and analysing are performed by controlling. Internal ad-hoc analyses (conversion of patient care services, planning of departmental movement, reorganization, outsourcing assessment etc.) are also realized by the controlling, as requested by the general or the medical director.

III.4.3. Relation of public health care and controlling system

After the introduction of performance-based financing in 1993, hospital management was regulated by managers enhancing performances.

'Since 1995, from the first cases of controlling to the appearance of PVL, the easiest and most popular tools enhancing management were all offensive – all based on revenue growth, and not on restrictions on expenses or cutbacks. As a stoppage to that, they introduced PVL, a revenue stopper, and by that and thus cutting back expenses, in-house results, coverage and institution-wide results could be enhanced.' (EI)

Lots of criticism is thrown at financing for underfinancing and the disproportion between professions. These generate deficit and carry it on through the system.

'Money is missing from the system (50-70-1000 billion HUF) ... we work with very tight budgets. The 2012 budget was carried on to 2013 with a 15% decrease and this is still held in 2015.' (MI)

'there really is a National Insurance pot affected by constant inflation throughout the past 5 to 8 years ... during normal operation losses are 10-15%.' (EI)

'while this financing is being 'eaten up' the entire budget is held still for 4-5 years ... you could almost say a 2 to 4 weeks' worth of money is just sitting in the budget.' (EI)

The performance limit turned financing into base-financing and generated a new way of thinking and management, pushing controlling tools into the background. Handling PVL and distributing them between professions became the main focus.

'With the appearance of PVL financing immobilized in the system, compromising the otherwise so strong controlling.'

'Due to patient care being the main interest of hospitals, if need be, they can go above; and they do. This means patients are cared for, some of them for free actually. If they kept the balance in the meantime, bankruptcy would not occur.' (EI)

In a hospital, knowing the costs, fixed or varying is essential. This however was only recognized by only some of the state-owned institutions with enhanced controlling systems. So these institutions

'tend to do expensive activities less because the more they go above the PVL, the more deficits these activities cause.' (FGI)

'More expensive professions based on cases, i.e.: optometry, surgery or orthopaedics induce higher costs over PVL, while in cases of fix rate medicinal or psychiatric professions, otherwise expensive due to HR expenses, it does not actually matter if 100 or 110 patients are treated since those few extra cases make no significant difference in expenses.' (MI)

The amount remaining in the National Insurance budget at the end of the year is distributed in order to settle outstanding debts at year-end or to reduce waiting lists, etc. This amount had been distributed between institutions based on performance in previous years however recent years' experiences indicate that the bailout amount depends on debt service of individual hospitals and their ability to lobby.

Is there any outstanding debt of the hospital older than 60 days? ... They all had it ... they started to compensate suppliers in a different manner.' (EI)

'this is bad practice since they are kept in a state where they are not interested in keeping liquidity. Thus there is no retaliation if supplier debt service overruns ... the government rather injects a single amount, not believing at all in the possibility of reproduction in case of a 100 billion raise in financing.' (MI)

Debts make heads of institutions concerned but they do not inspire them to a more effective management because their message is such as this: 'due to debts my losses will be compensated so why should I make an effort to stand against the clinic and so on...' Operational budgets, economics and other features were much more transparent in the decentralized municipal system.

'as a head of an institution I was completely aware of the fact that if I became indebted and bankrupt then someone would have to stand up ... but I was completely aware of its relations with the hospital and also with its financial situation. I could actually influence this too. But only as far as that: if I become

bankrupt then no more care. No care means scandal. In case of a scandal I become headlines. Headlines mean replacement and so on... There once was some kind of a red line up till which the owner could have helped but only to a certain limit.' (EI)

III.5. Paradox of devaluing controlling system

The hospitals have been nationalized and this has different meanings:

- common ownership,
- a common administrative rigor: data services, administration and monitoring tools,
- a sensitive area driven by politics and personal relationships, and
- unexplained unsolved common problems and untold or hidden expectations.

It is impossible to reach a system-wide solution (balanced management, retention of human resources, operation of controlling and motivation systems) without the elimination of under-financing (increase of HDRGs and German points) and resolving the disproportionate financing between the medical professions. There are no reserves in the health care system, according to concordant opinions of managers, controllers, experts and even the owner, without damage to the interests of patient care. There has not been a HDRG revision of the comprehensive structure of professions since the introduction of the performance financing system. This results in the outlining of the profitable, 'high-paying professions' (oncology, cardiology) and (manual) the deficit-making ones. Hospitals are trying to 'provide care with a smaller deficit' and increase performance as far as possible. But the increase of financing and the revision of HDRG codes has become a necessity.

This approach causes a fall in the value of controlling, and it is even more needed to know the information of accurate coverage of cases for the selection of the appropriate professional portfolio. Instead of using the controlling devices, the hospitals try to maintain the financial balance with optimization of PVL and so revenue.

	performance financing without limitation (1993-2004)	period of PVL (2004-2015)
approach	performance based (controlling)	financial
management	increasing performance	liquidity and budget management
controlling system	period of growth and intensive use of controlling tools	varying in institutions, typically no use of controlling devices
human resources (controller)	essential element, providing financial bonus, premium	due to financial situation, no controlling in most hospitals
motivation system	positive and financial motivation	no
financing	introduction of HDRG is initial challenge	decreasing in real value
institutional budgeting	clean conditions, 'red line'	softened budget constraints
debt management	municipal support	expectation of debt settlement

10. Table: Effect of health care regime change on controlling (own table)

The basic conditions for use of controlling tools are the knowledge of the advantages and disadvantages of these devices, as well as strengthening the management approach. To do this it is also essential to develop competences and training of top and middle managers.

According to Merchant [2007] good management control means that the manager can be assured to a reasonable limit that significant, unexpected surprises will not be happening. The interviewed managers clearly defined best controlling practices: basic requirement is the production of data based on an accepted methodology and strongly supported by information technology. The controlling system continually provides reliable data for the daily operation and this data and reports are available in each department according to their needs. The reports include the key performance and capacity indicators, and their two-year comparisons and prognosis. The heads of departments monitor the revenues and costs every month.

Another essential condition for a well-operating controlling system is the controller with appropriate qualifications and abilities, to whom the leaders can communicate the rules and expectations. Hospital controlling is unthinkable without well-trained, resourceful, proactive controllers who also have to be accepted by the leadership. If the controller is not available, the hospitals use external consultants but the function is typically narrowed down to optimization of financing and to analyses based on benchmark data. Unfortunately the creation of a controlling unit is a problem to – mostly smaller – institutions. In these cases, the solution could be the establishment of

decision support functions ‘in networks or within regional integration frameworks, even in looser functional integrations.

III.6. Summarizing

Due to the underfinanced procedures, limitation on performances and withheld NHIF payments, the health care system lacks resources and this causes a continuous rise in debts of suppliers. This environment would require a better use of controlling devices however the result of this qualitative research is the devaluation of hospital controlling systems. As a result of the centralization and the phenomenon of debt consolidation, financial perspective is in the thinking of hospital top managers – they try to achieve economic stability with monitoring of liquidity and lobbying for bailout. Thus the current controlling system is basically focused on financing, many institutions only deal with performance analysis, and department-level controlling works poorly and patient-level controlling and modelling does not function.

In the budgeting process, the head of department and top management agree on the operation criteria. They monitor it and provide feedback. In case of hospital budgeting, there are no agreements and negotiations, and due to low hospital budgets the budget rows are unenforceable. The regulated budget rows are only approximately 20% of the budget and are constantly modified according to use and needs throughout the year. The function of budget rows would be a strong limitation on costs but the patient care and the low hospital budget regularly overwrites this.

The appropriate response to all of these problems is clearing up financing on government levels but to achieve this, the institutional cost calculations are essential. And this comes to a full circle here since the same is required of hospitals: a strong controlling system with managerial decision support. The coverage calculation provides an opportunity to prioritize successful professions and processes, and to determine the optimal professional palette. In Hungary there have been appropriate costing methodologies, and in the future implementation of IT support and motivation systems are needed. The underfinancing should enforce the strengthening of the controlling approach, for which the commitment of managers is required. This can be achieved with the development of skills and training. The practice of planning is also affected since

the current budgeting activity supports the liquidity management but management and patient care are sometimes hindered. The lack of medical interventions is resulted from the low and strict limits have a negative impact on revenues, below the PVL. For performance over PVL, the coverage calculation and definition of the appropriate capacities are even more important.

IV. USE OF MANAGEMENT INFORMATION IN HOSPITAL DECISION-MAKING

This chapter of the dissertation can publish in Egészségügyi Gazdasági Szemle (Hungarian Health Economic Review); the content and form is identical.

The research presents the scope and use management information in health care institutions. The area has diverse international literature, so the article limit to logic of hospital operation, result of role conflict, economic and clinical factors in decision-making. In the research qualitative methodology was used for data collection: managerial interviews and in case of decision support, homogeneous focus group interviews.

The top managers typically put emphasis on financial information, and examine mostly the historical data, with negligible future scopes. The head of department (physician) decide on the basis of professional and use non-financial indicators. The use of management information in decision-making has more diagnostic style, only a few managers apply interactive controlling systems, basically in the absence of strategic thinking.

I propose to strengthen the use of controlling systems, which most important elements are the development of institutional internal communication and economic and managerial skills.

IV.1. Introduction

In the early 2000s, Scandinavian and Western European authors started to examine hospital management information systems. The movement and reforms of New Public Management, which target are the market-oriented operation [Drótos et al. 2007] and radical improvement of public administration performance (ie. efficiency and effectiveness) [Bodnár et al. 2011], generated to apply the management techniques of business sector. The central element of NPM reforms is the application of accounting information; therefore, accountability and responsibility are key words [Nyland – Pettersen, 2004]. The NPM brought radical changes in the field of financial/accounting systems and increased the transparency and flexibility of public sector [Rosta, 2012].

Many international researches were made in the field of health care controlling and management accounting, which negotiate the scope and using of managerial information, logic of management, or even the role of conflict, the phenomenon of special sectorial decision making. I examined the information usage of top managers and department leaders of health care organizations, usually hospitals, clinics, centers. Based on the international research and definition of information technology in public sector Drótos [2012], I studied the use of Hungarian hospital management information and controlling system and wrote three research questions:

- 1) Where are the information points in hospitals for supporting management decisions?
- 2) What is the scope of management information?
- 3) How do the top managers and medical managers use the available information?

For the second research question, I accept and apply the board scope management information definition of Bouwens - Abernethy [2000]: *external focus, future-oriented, and non-financial information, which offers a wider range of solutions for managerial decision making*. In contrast, the typical narrow scope information is *internal focus, past-oriented and financial, classical accounting information*. The use of this information (third research question) is examined by interactive and diagnostic perspective of Simons [1995], which is detailed in the literature in the presentation.

In the first part of the publication, I define the hospital characters and summarize the results of international literature, then introduce the qualitative methodology. At the end of this paper, I present the results of the research and the conclusions.

IV.2. Use of management information and decision making in health care institutions

IV.2.1. Definition of hospital characters and institutional hierarchy

The lowest (first) level in hospitals hierarchy of decisions is the meeting between clinical staff and patients, the next level is the departmental level, where leaders meet with their colleagues, then the relationship between the department head and clinical leadership. The Moving up on the hierarchy, the logic changes from the team-oriented, knowledge sharing, collective focus on patient care to a more individual focus, managerial perspective [Nyland – Pettersen, 2004].

The hospital key decision maker, on highest level, is the manager (director), the medical or clinical director, nursing director and financial leader. According to the definition of Kuntz – Scholtes [2008] the doctors are practitioners, the manager is not currently practicing his professionals; the categorization focus on roles, instead of educational background, due to the different way of thinking originating from activities [Schultz, 2004].

manager	clinical leader and his role	
decision-making in the interest of the organization	decision-making in the interest of individuals	participation in budgeting processes (based on previous period) long-terms plans, strategies and analyses are less used (cost, capacity, medical practice) planning of future activity or analysis of medical practice hardly used
accountable to multiple stakeholders	accountable to profession	
decisions led by organizational goals	decisions led by professional rules and norms	
group decisions, political environment, bargaining, compromise	normative and autonomous decisions	

11. Table: Factors of decision-makers,source: Kuntz - Scholtes [2008] és Pettersen – Solstad,[2014]

The clinical activity based on professional guidelines, doctors are strongly committed to professional values, so the clinical discourses separate from the economic area of the hospital. The strategy and budget documents have low express on clinical managers, who participate in the preparation, but less use it [Pettersen – Solstad, 2014]. According to Ferreira-Da-Silva et al. [2012], doctors will accept the economic criteria for clinical decision-making, but the professional, medical, ethical criteria still remain at a higher level.

The Hungarian law names the members of the hospital **top managers**: the general director, finance director, medical director (supervises and coordinates the medical and pharmaceutical activity, controls the operation of departments), and the nursing director (monitoring and coordination of care activities). The **middle managers**, identified as medical managers in the literature review, are leaders of professional department. The medical manager is mediator between top manager and clinicians, and link between the strategic, central decisions on investments and wages and the operational decisions on clinical activity. They communicate in both directions, so in their behavior it is perceptible the ‘budget mask’ and – communicating with colleagues - a ‘clan masks’ [Nyland – Pettersen, 2004].

IV.2.2. Diverse logics in hospital operation and the resulting role conflict

Health care professionals follow several types of logic simultaneously in their daily work: first, the medical professional norms and values internalized in professional decisions, daily clinical practice [Llewellyn, 2001], and the doctors, professional staff and nurses focus on norms and values focused and see their work as careers [Kuntz - Scholtes, 2008]. This can lead to ‘clash of cultures’ [Abernethy – Stoelwinder, 1995], because the administrative culture is built on the logic of consequentiality, the clinical culture of doctors and nurses is built on the logic of appropriateness [March – Olsen, 1976, cited Nyland – Pettersen, 2004]. The medical activity is governed by professional and ethical logic and professional discourses which are based on communicative rationality [Pettersen – Solstad, 2014]. In their categorization, the clinical managers are facing at least three types of accountability: managerial, professional and personal

accountability. In this triangle, the ‘managers balance the professional logic and the enterprise logic with the political logic’ [Torjesen, 2008, cited by Pettersen – Solstad, 2014].

According to Nyland – Pettersen [2004], the clinical responsibility is a collective responsibility; managerial responsibility, higher up in the hierarchy, is based on personal moral and norms. Despite the managerial importance of economic performance, ‘the budget deficits have had no negative effect on the evaluation of the clinical department managers’ performance. Furthermore, budget deficits were seen as a means of getting more resources from the owner and were in reality, considered as flexible budgets.’ In contrast Lapsley [2007] says that the financial management and accounting information play increasingly a significant role in managing hospitals at department levels.

‘Physicians’ belief, medical ethics do not allow resources to be wasted, however the economic cost in the decision-making process only occurs when the patient’s clinical situation is safeguarded. This means economic efficiency is subordinate to clinical criteria, i.e., in case of a conflict between economic and clinical criteria, the physicians’ priority is applying clinical criteria.’ [Ferreira-Da-Silva et al., 2012]. The medical-oriented perspective and quantitative focus on the economic point of view is a strong dilemma for doctors [Malmrose, 2014], and involving medical professionals in commercial decision making generates a role conflict that has a detrimental effect on medical performance [Abernethy – Stoelwinder, 1995]. This conflict can be reduced if the budgeting process is clearly and transparently linked to organizational objectives [Abernethy - Brownell, 1999].

IV.2.3. Relationship between economical factors, curative activity and clinical decision-making

The relationship between the budget and the medical profession is closely and based on communication on the top management level. The further down in the hierarchy and closer to the clinical decisions, the looser the couplings are between budget and action [Nyland – Pettersen, 2004]. As at lower levels in the hierarchy, close to the doctor–patient relation, looser couplings between formal budget plans and action are expected.

This can be improved if the managers involve the physician more strongly in the decision-making [Goldstein – Ward, 2004, cited by Kuntz, 2008]. Because goals and plans are external factors for doctors, it could lead to a strong resistance against the use of management information [Abernethy – Stoelwinder, 1995, cited by Ferreira-Da-Silva et al, 2012].

During the research of accounting information and clinical decision-making, Ferreira Da Silva, et al. [2012]

- Therapeutic protocol (result of team consensus) and hospital forms (defined by high-level hierarchy) are seen as two cost controlling tools, which reduce the doctors' autonomy, but the physicians recognize their economic, organizational and professional advantages of these tools. The involvement of physicians in designing economic controls facilitates their acceptance.
- Physicians have an approximate idea of costs, originated from external source, for the prescribed diagnosis and treatments. This limited to direct and explicit costs.
- However, hospital, and even service, costs and revenues, and their accounting assignation, are frequently ignored by doctors because of their perceived irrelevance when compared to medical information. The clinical performance indicators (e.g. average duration of hospital stay) are acknowledged.

IV.2.4. Scope of management information

The broad scope management information is crucial for managerial decision making [Mia – Chenhall, 1994], with Abernethy – Guthrie, 1994 analogy, organizations are facing complex situations, high environmental dynamism and strategic uncertainty. Bouwens – Abernethy [2000] define ***broad scope of management accounting information***: *has external focus, future-oriented, and non-financial, which offers a wider range of solutions considered to managers*. The typical narrow-scope information (traditional management accounting, which is internal defined, financial and past-oriented) is supplemented for this purpose. The wider range of information supports managers to better understand the relationship between activities, processes and strategic outcomes.

IV.2.5. Style of information use

According to Strauss - Zecher (2013), the authors (Merchant – Van der Stede, Anthony – Govindarajan and Simons) of three top-ranked textbooks provide similar definitions of management control systems, the first two authors represent ‘command and control’ perspective. According to ‘innovation and control’ approach definition of Simons [1995], management control is ‘the formal, information-based practices and procedures used by managers so as to maintain or alter the patterns in organizational activities’.

Simons’ ‘*Controlling business strategy model*’ separates the diagnostic control systems, used to motivate, monitor, and reward achievement of specified goals and interactive control systems, used to stimulate organizational learning and the emergence of new ideas and strategies. The diagnostic perspective is a usual organizational point of view, which examine unusual incident and potential problems with quantitative data and analyses. But interactive control focuses on dialogue and formal, informal communication, with helping to concentrate to the uncertainties and to fine-tuning the strategy. One of the most popular tools is the data analysis in the report, but there is four important characteristics which set the interactive control systems apart [ICFAI University, 2006]:

- focus on constantly changing data that are of a strategic nature,
- the strategic nature of the data warrants frequent and regular attention from all levels of management,
- data generated is best analysed in face-to-face meetings which include employees at all levels, and
- system stimulates regular discussions relating to the underlying data, assumptions and action plans.

In the interactive perspective, the managers focus on communication and monitoring of organizational processes, while diagnostic perspective focuses on output and has strong performance measurement [Osterger, 2009]. The interactive use of the management control system gives a better understanding of the strategy and understanding of cause and effect relationships between performance indicators and results [Tuomela, 2005].

Ostergren [2009] identifies characteristics of the two control systems. The clinical managers, used the control systems in interactive way, have direct contact with other classes, fewer activities are decentralized and have intense relationship with financing department. In these institutions, it is important the consensus solutions with the feeling of 'siting in the same boat'. If one department has deficits, one of the other departments gives some of their resources to the department in crisis. The leaders have a lack of knowledge, not only within accounting, but also with regard to strategy and human resources. The institutions, used controlling in a diagnostic way, are more decentralized organization with perception of more autonomy and balance of budget is in focus. Contact with the financial department is less intensive, which require accounting knowledge from managers. They became 'hybrid clinician managers': have experience in budget systems and budgetary processes and use their autonomy in decision-making. But clinician managers need time to build knowledge, structure, and culture in the new system.

According to research of Naranjo-Gil – Hartmann [2007], the use of budget in interactive approach lead to higher organizational performance in dynamic strategic environment; the low level of strategic change matches with diagnostic use of management information. The interactive use is essential for dynamic strategic change, while it supports the innovation [Naranjo-Gil – Hartmann 2007, Naranjo-Gil, et al. 2008]. They found a positive relationship between the medical professional leadership and interactive controlling use and non-financial management information system (MIS), and positively correlated the strategic change, interactive use of MIS and the heterogeneity of top management. In addition, interactive MIS can influence the individuals' behavior and improve the management team's commitment and socializing [Gómez-Luiz – Naranjo-Gil, 2011].

The managers prefer the formal top-down control [Naranjo-Gil –Hartmann 2006], focus on general and economic parameters of the organizations, and less emphasis on the basic operation indicators [Benveniste 1987] and innovation of the system [Young et al. 2001]. Due to informal control preference of doctor-managers, conflict is generated between the leaders. However, the heterogeneous management team has a positive assessment in the literature. The benefit of top management team with varying backgrounds and skills is the access to different source information [Kuntz – Scholtes, 2008]. For summarizing,

- heterogeneous top management has wide-range, more committed in the search for opportunities and provides a broader portfolio in the responses to environmental demands and has more ability to detect strategic opportunities and to and identify the strategic need for change;
- in strategic change, diversity is beneficial in terms of the backgrounds, such as age, experience, tenure, and education [Carpenter, 2004], but in the creativity, the age and the tenure is less important (innovative perspective and diversity of information);
- heterogeneity of TMT has more different opinion regarding the strategic change, resulting the creation of more alternatives [Wiersema – Bantel, 1992];
- heterogeneous TMTs appear to be more inclined towards organizational innovation and diversification, while they require a broad portfolio of strategic perspectives [Bantel – Jackson, 1989].

Several Hungarian literature (for example, Antal – Dobák, 2010, Bakacsi, 2004] discussed the managing and operation of groups or the impact of group roles, but analysis of the heterogeneous composition of top management and its hospital relation has not been implemented and the use of controlling neither.

IV.3. Methodology

The focus of my research is at the institutional level: interpretations, tools and daily practice of the controlling and planning system and their incorporation in decision-making were all examined. Therefore, from the model, the middle managers, top managers and decision supporters from secondary stakeholders and managers of the owner from primary stakeholders were included. A total of eight personal interviews were made with managers of hospitals (citation with MI notation) and 3-3 with experts (EI) and owners (OI) alike plus one homogeneous focus group interview (FGI) with decision supporters. The interviewed top managers of hospitals were typically from ones with a large number of beds but the diversity in the use of the controlling system

was taken into consideration. Three NHIF-financed but profit-based enterprises were interviewed, two of which are state-owned.

The focus group was small (6-8 persons), as the interviewees have experience from several institutions. Moreover, they are highly motivated and committed to managerial decision support. Characters of the focus group:

- homogenous group with two represented areas (finance and controlling), which are closely linked;
- participants have experience from various hospitals (different location, size, structure, management);
- dedication and forming strong, definite opinions have all been assumed based on the questionnaire;
- open and inquisitive team, but with participants typically women (this may be true in the profession as well).

During individual and group interviews, semi-structured interview situation was generated and ‘technique of funnel’ was applied – structure was increased thus using the advantages of strong and weak structured questions. In addition, additional questionnaires were used before the focus group discussion for better understanding of the research topic and the respondents' views. The interviews were built on each other: starting with expert interviews (1.5 hours) followed by a focus group (1.5 hours) and maintainer interviews (0.5 hours). With the expansion of this knowledge, the interview questions of hospital managers were specified. The interview time was initially 1.5 hours then 1 hour. The interviews were typed and after having read them several times a quick report was prepared to keep as a guideline during the final analysis.

Based on the text from the experts' interview major categories were marked with open source coding in Verbi MAXQDA 12 software, and then these were divided into subcategories during the encoding (axial coding). I returned to the initial coding, as long

as new categories were not introduced by the re-encoding. For checking the coding infracoding¹⁴ was applied. The categories of coding are presented in Figure 14.

Categories	Subcategories
Defining	decision maker decision supporter
Scope of information	middle management top management
Use of information	middle management top management diagnostic interactive
Motivation system	-
Role of conflict	-
Management	attitude of management organizational specialities void of 'system approach'

14. Figure: Codes in the research (own figure)

IV.4. Empirical findings

IV.4.1. Decision-makers and decision supporters in Hungarian hospitals

The role of financial director, medical director and nursing director is changing depending on the size of hospital, local conditions and the attitude of managers but the smaller hospitals are typically led by the director and the financial director or medical director. The nursing director has very partial role. The top managers often work closely together with directors of priority areas (e.g. strategic director or chief legal officer), and sometimes they also delegate powers to them in decision-making.

At mid-management level, heads of professional departments have little power to make decisions; in general they oversee the work of the department i.e.: coordination of patient administration, determination of the performance volume, management of curing equipment and medicines, so basically internal cost distribution. The head of the department is responsible for the curative care and related administration, the ethical standards and training of doctors and nurses. In theory, the leader monitors and

¹⁴ I recoded the same text in a few days.

evaluates the patient-, performance- and economic-data, but the intensity of this activity depends on the needs and commitment of the general director.

The decision support of hospitals depends on professional heterogeneity, institutional size, attitude of managers, but it is typically scattered by function in the institution and/or is been next to top managers. Some institutions have/had stand-alone central decision-support department and staff. According to the managers asked, decision support is identified as controlling; surprisingly, even in those institutions where this function does not work. However after further thoughts about functions, they will also add other functions like financing, budgeting, engineering, information technology, legal or public procurement not to mention the weakest areas such as labour and human resources management and decision support. In theory, controlling has an important role, but in most hospitals it does not work or only with limitation. It often has a function in supporting the planning and analysis of performance, and the liquidity and financial management.

If the controlling department has no capacity or specialized knowledge, institutions purchase services of external consultants, primarily to optimize financing or benchmark analysis. But smaller institutions are forced to outsource the whole controlling functions, as well.

IV.4.2. Scope of information of top management and department leaders' thoughts

Due to the sectorial financing, continuous debt and the 'struggle with unpaid bills' the focus on future trends is reduced. In addition to searching for short-term options, leaders are trying to maintain the operation with actual data from the past.. In those few institutions with less daily payment problems, there is more attention for planning and influencing the future.

In summary, top management primarily puts the emphasis on financial data, with close co-operation with the economic area¹⁵. Within the financial data, mostly the historical data is examined through a lens that highlights measures improving management – currently mostly those ones reducing costs. There are only a small number of hospitals focusing on the future, despite having some kind of strategy or development plans. As a result, long-term thinking is rare: it appears and indicates the operation mostly in profit oriented institutions. Top management requires the indication of controlling data differences, which specifies areas for more detailed analysis. At this level, most data is about performance, capacity utilization, departmental performance and coverage and the analysis of deviations and its causes.

Financial focus. Financial data has the most weight in decisions and the management focus is on PVL, budget, liquidity and financial situation. The role of revenue data is excessive; the leaders are continuously monitoring performance which in turn affects their decisions. The managers feel that cost data is invalid ('blind flight') but recognizing the importance, they try to explore the department- and patient-level costs.

'The financial information, however, can no longer be omitted from our decisions. The underfinancing, the continuous rise of debt service, the lack of value follow-up, the price increase generated by economic crisis all cause deficit. If you do not pay attention, the institution can easily become inoperable. However, this should be done in a way that patient care does not get damaged and the institutions fulfil the protocol-based professional criteria and comply with requirements of the health act.' (MI)

Those hospitals which use a well-functioning coverage calculation, not only focus on capacity and performance monitoring, but also on knowing that coverage. Their decision making is not limited by the financial data. In several hospitals there are customer satisfaction measurements, medical and professional employee satisfaction measurements or Balance Score Card analysis. Nevertheless, the leadership can decide only on the basis of financial data. A typical example is cost reduction methods such as

¹⁵ In Hungary, the general director generally has medical qualifications perhaps with additional management diploma.

energy investment, heating modernization, restructuring and in other questions, not concerning the patient care.

Future-oriented data, rather than past-oriented data. Top management examines typically retrospective data and use its implications in daily operation.

‘Regarding future concepts, we can always rely on past data; by reviewing them and after deducting the consequences we can expect better performance and optimized management.’ (MI)

‘Our days are unfortunately spent by mapping the past but there are already intervention areas where we have achieved rapid information services and thus we have an opportunity to intervene. But most of the activities are the follow-up.’ (MI)

Small margins generated by the limited performances, as well as the continuous changes in legal and financial environment require managers to solve the everyday and past problems (revenue encodings repair, a more exact understanding of costs, etc.). Only little management can say that they use information fully: not only the past-oriented information but also consider the future as well. For example: before the introduction of PVL, analyses of CT and MR investments were future-oriented.

‘Those who did the controlling well – in the early 2000s –, had forward-looking information. Today unfortunately only retrospective data service works. Present is compared to the past’ (FGI)

‘We have professional development plans, development concepts, so we deal with the future too but basically with the present. We make decisions at the present, but normally use the recent numbers, so for some actions or conversions we usually look at the performance data of the past 1 year or 6 months.’ (MI)

Currently, forward-thinking occurs once a year within the framework of the planning. Because of the significant financial perspective, the continuous forecast is important for planning and the continuous correcting of the HDRG and German points but only in the current year. Hospitals are limited by ‘PVL, the total uniformity, and the lack of incentives for professional portfolios’.

Significant short-term and weak long-term thinking. The use of future-oriented information is already a kind of long-term thinking but this is more typical in profit-based institutions, where savings are invested into investments reducing operational costs. From investments major improvements are long-term; while minor ones are always very short term, a year maximum, depending on the results.

'So my strategy is simple: the renovation of real estate for the next five-years is in my head. We talked about the principles and the great improvements with the divisions but about the medium and small improvements we always talk during the previous year, depending on budget.' (MI)

The lack of resources, insecurity, continuing change of legislation and financing all encourage public hospitals to think short-term. Furthermore, there are institutional development plans but the realization always changes according to the sources: if there is a project for energetic modernization then that will be the focus.

Integrating internal and external data in decision-making. In the hospitals, typically, creation and use of internal data occurs which are more focused on the past and cover financing and performance. Out of the external benchmark data, the ones prepared by experts and National Health Insurance Fund will get to top management, typically once a year during budget planning. This gives an opportunity to compare revenues and costs of various professional units and to encourage them for more efficient use of resources.

The wide range of information is generally limited to professional decisions where the *department leader* is concerned. They must be involved in the classic planning (if the hospital does it) and they will also receive feedback on their performance with variable frequency. The management information sent to them is of wide range but it also is dominated by non-financial indicators: performance data, patient data, case-mix index, bed occupancy, SNH. Due to the financial focus of the top management, reports are complemented by economic indicators and data, financial balances, revenues, costs, commitments and sometimes benchmark data.

'The benchmark is probably the only tool that can be annoying to department leaders. In the benchmark profession meets money: high drug and personnel

costs are incomprehensible for them the. Comparative unit costs have to be taken into account. (EI)

In several hospitals, Monthly reports to the physicians about their performance and coverage of interventions are general practice but due to the absence of incentives, it usually works effectively only in profit-based hospitals. There are reports to physicians in public hospitals too but they are solely limited to performance or income: patient data, interventions, number of reported cases in HDRG and German points, bed occupancy, surgical numbers, etc. Regarding cost, managers are interested typically in the costs of blood and drugs implant prices.

IV.4.3. Use of management information in department leaders' and top management decision-making

The use of information depends on personal factors (age, family status, personal motivation and work commitment), professional factors (work experience, professional and personal perspectives, adopted ethical rules) and organizational factors (co-culture, management control system and interaction with superior leader) [Ferreira-Da-Silva et al. 2012]. In my research, according to responses from controllers the use of the information is *'highly dependent on managers and they work in a broad medium'*. Opinions vary about managerial use of information and controlling: most of them mention age, experience and socialization as influential factors; the organizational background, like experience, is incorporated into the professional factors. According to managers and decision supporters, the lack of economic and managerial education of doctors is a very great problem.

'There are/were very few non-medical top managers, 10 or 20 hospital general directors in 20 years.' (EI)

'At medical universities management sciences are also taught but not at a level that is necessary to manage an organization. In addition, 95% of physicians did not go to medical school to learn management. However without this knowledge 70% of leaders is incompetent. This is not because they are not good men but because they have no idea what is expected of them, plus they do not know basic

techniques, methods and tools, and therefore they do not create situations where efficiencies could improve. '(MI)

In addition to this approach, managerial level also determines how decisions are built on available data; top management and middle management typically think differently which can be explained with their separation from patient care. Top management puts more emphasis on financial data while in decisions of department leader with management approach, the professional and financial aspects are also present.

IV.4.3.1. Use of information by top management

In hospitals operating a controlling unit top managers continuously rely on information and proposals of decision-makers; middle managers provide and receive data and then base their decisions on them. However the use of management information *'is very dependent on people'*.

'We have a manager, who looks at the controlling report each month – performance- and cost-wise– and examine all itemized coverage then asks for comparative data from the previous period and asks for justification in case of changes ... Let's see, let's talk about it. '(FGI)

'How often do top managers use internal information for decision-making? Always. I have to prepare numbers and he always remembers it, every time. If next time, two decimals are wrong, he knows immediately this was not it the last time. He clearly remembers. '(FGI)

'Whoever has even a little economics in his veins in the top management, I think they will use it. Those who have not, will not necessarily use it because they do not see into it ... So in one institution there is a very strict budgeting while in the other I just started to develop it because there was nothing. '(FGI)

Depending on the attitude and management knowledge of top management, the management information produced by controlling can be widely used, i.e.: to optimize revenue and performance. In general, the medical director plans manually, usually monthly or quarterly, the expected performance from the departments.

'We use the revenue side of controlling: units and performance are constantly monitored and we take these into consideration in case of decisions... but only on the revenue side. The expenditure data is not valid so we do not use them. Unfortunately this is blind-flying.' (MI)

'The main agenda of medical leaders' meetings is performance and PVL utilization in in-patient and out-patient care. The units can, on daily frequency, ask for control on their daily status but they will be informed weekly during departmental meetings.' (MI)

Beside PVL expenditure data are rarely examined; if the HDRG is differing from the plan, management may shape the budgets. During the management of expenditure budget budget-frames are changed continuously: it is reduced in case of low-performance and increased in case of professional demand.

'Actually, the budget is no budget; it may be exceeded however a gruesome and confused administration might belong to it.' (EI)

'Under-budgeting of drugs or professional materials requires a reasoned professional report in all cases. If the acquisition is justified, it shall be permitted; if it is not, ingredient substitution (for medicine) or reduction of the material needed occurs. If the departmental allocation of costs is exceeded, the department leader informs the top manager in writing about the reasons of the deviation. If the excess is not justified, the difference will be incorporated into next month's budget.' (FGI)

This type of management of PVL and budget is the 'baseline' in, you could say, all public hospitals. Besides

'of course, I should always examine how much the debt will be, what will happen at the institutional level and how much the deficit will be. But it should not necessarily be examined what internal medicine, surgery or neurology are exactly doing and how much savings they should make.' (EI)

Much less leaders use the information for the improvement of the professional portfolio, despite the fact that at this level by knowing the coverage, the management of

hospitals can be heavily influenced. Those managers who use the information think like this:

'I start to play with the professional portfolio of the department and forbid the physician to carry out certain operations. Of course not the indispensable ones, and i.e. laparoscopic surgery with good coverage cannot be forbidden.' (MI)

'I need to see what portfolio I will compile. As, coverage-wise, I know the profitability and coverage-generating capability of the profession I can rearrange the professional portfolio according to what should be increased and what not. In addition I often undertake professions with bad coverage because of their patient indicator role. The great art is to maintain expensive professions e.g. endocrinology or internal medicine, which are absolutely unprofitable, but they generate patients and send them onto radiology and ultrasound both of which has a positive coverage. You should be able to optimize this like a master.' (MI)

'PVL is given... the professions might be rearranged... with a lot of resistance ... due to termination of supplies and professions with a deficit.... There is no top management that would dare this.' (EI)

The processing, analysing and interpretation of benchmark data is a special tool of top management to keep the operation of departments in hand. After understanding internal and external benchmark, management generally selects departments to be examined more thoroughly.

'They also have a picture not merely about the bad management of a department compared to a national benchmark but also about caring longer or diagnosing more, using more expensive drugs, or buying more expensive and more innovative products.' (EI)

'If you change these to unit cost in the benchmark and compare them, doctors will then have to start thinking about it and they will say that they are not like others... so you can annoy them... Gynaecologists do not only hear that they are uneconomic or even more uneconomic than others, but they will also find the main problem: too many doctors, too few patients, imperfect administrations, too much therapy, too long length of stay...' (EI)

To ensure optimal use of scarce financing and targeted project sources managers rethink hospital structures and try to operate them more economically and efficiently (e.g. optimal positioning of professions, use of modern techniques) within their budget and other capabilities.

'We use quite a large structure and there is often a need for analysis to rehouse a clinic to another location, with smaller number of beds. How then will that affect the economic balance of the clinical centre.' (MI)

'How to develop and reorganize central operation? This is what is needed to know what to put the emphasis on during annual budget planning.' (MI)

The issues of patient safety and quality barely emerged at top management level, which leads us to the conclusion that, on one hand, these areas are the responsibility of medical leaders and, on the other hand, controlling does not collect data about them.

IV.4.3.2. Medical leaders' use of management information

The top managers of public hospitals define financial expectations (achievement of defined revenues and expenses or keeping coverages) for department leaders. The controlling helps physicians' work with administration, treating budget rows and with monthly or quarterly feedback. The use and communication of these reports vary.

'There's a very broad spectrum. There are hospitals where data is uploaded onto the intranet monthly and there are ones that print and post them to the departments. They make it available. Some hospitals prefer to keep the summary and if they see problems, then a random class discussion will be held, highlighting the critical points ... that is dependent on the institution-.' (EI)

Due to the top management needs medical leaders monitor performance and/or accounting and benchmark data, and intervene if necessary. The achieving of planned performance has special emphasis: the performance indicators are available (online) and every week or fortnight data is provided by controlling. For doctors, professional information and performance are important, but they also need to monitor the use of medicines and materials, which do not necessarily occur.

'If they are within budget, department leaders are glad, but otherwise they do not deal with it... there is a soft budget constraint everywhere... department leaders mostly try to analyse and explain past data... controlling deals only with the actual cost processing... (FGI)

On the level of department leaders, professional choices dominate but leaders are involved in planning and they also receive feedback on their performance. To what extent the economical and managerial aspects are taken into consideration depends on the personality and expectations of top management.

'The financial and economic consequences typically are not considered in clinical decisions.' (MI)

'But there are well-respected, famous chief medicals, which (still) use controlling and pay attention to the performance of the department. There are also the ones who use it less. This is a topic of constant debate.' (MI)

'It is rather the visions of the leader that have greater importance... to think perceptively and build the department with conscious organization regarding staff recruitment and to take into account the future changes in obligatory care per territory.' (MI)

Due to the existence of exclusive responsibility of patient care and the lack of economic responsibility on department level, the data is ignored. The job description of leaders does not contain the responsibility for departmental effectiveness. There is no requirement in the system. For the use of controlling data and to strengthen management approach, physician leaders need education and skills training, on the one hand and, on the other hand, a motivation system is needed to be built and professional liability should be associated with economic responsibilities.

'The departments do not have any choices, the leaders are not responsible. The one main reason for this is the lack of a motivation system.' (MI)

'Lead physicians can only be persuaded to use financial/budgeting information and information related to performance by a financial motivation system.' (MI)

In institutions with heavy use of controlling, the practicing physicians receive monthly reports from the interventions, in which coverage information and professional

data are displayed: patient numbers in a type of surgical group during a period, number and time (minutes) of surgeries, , length of stay before and after surgery, average indicator of physicians. In addition to income and expenses the consumed units are also presented.

'If doctors do not know how costs arise, they will not understand. 'Oh, really I operated 85 minutes, not 75 minutes.' and they remember well and can tell why ... '(MI)

'Each surgeon's surgical time is measured It can be underestimated or overestimated. Overestimated time means the resource seized; underestimated time cause slip in operation, which bears discontent... '(MI)

In these institutions, the planning is not just about revenue and cost planning, but also about the planning of capacity and continuous monitoring. Beside the information of performance and coverage, the physicians receive their plan and actual data of surgical capacity. Professional discussion of cases occurs at weekly or monthly meetings but management information are discussed quarterly so numbers can be integrated into the professional thinking.

IV.4.4. Conflict of roles of medical leaders

Due to the physician-patient work, professional decisions and patient safety is the primary consideration in departmental decision making. Medical leaders who manage their 'department as a company' experience the phenomena of conflicting roles. This is confirmed by the fact that

'leaders elected by someone other than their superior look into their colleague's eyes in a way... that they want to be looked at, to maintain a working community which is more conflict-free.' (MI)

The compliance to physicians and limited economic environment generate tension in doctors with management approach. In case of these role conflicts:

'The leader favours the medical profession and gives up the economy principles and expectations required from them. In case of conflicting roles the

professional side appears as stronger; their decisions are influenced by these aspects. Moreover, because of their practice, they can have personal interest, which is contrary to the expectations formulated for a manager. '(MI)

According to controller and top manager opinions conflicting roles do appear but it is very important to emphasize that 'the economical and organizational management has to be part of the managerial appointment. They should not only be the boss in the operating room.' Expectations for departmental management and management approach are clearly rising towards lead physicians from the top management and controlling part.

IV.4.5. Diagnostic and interactive perspective of controlling systems

The controlling system is used in hospitals in a diagnostic manner, which typically comes from the fact that in the absence of planning, controlling means follow-up data analysis and evaluation. The department selected for more detailed analysis is examined and discussed at medical meetings and conferences. The interactive approach was before the introduction of PVL, when the departments were actively involved in institutional budgeting. Today,

'the manager needs data and analysis; he does not have much time to talk informally. In general, the top manager is very busy, and if he has time... immediately and now... and he asks...' (FGI)

'Top managers ask and I have to give at least three options out of which he decides.' (FGI)

Interactivity often depends on the tasks:

'managers ask controlling for any idea (on starting an activity or buying assets) and cooperate in a plan affecting their future but otherwise during everyday operation of the clinic, I think, the diagnostic way is more commonly used.' (MI)

'The introduction of the controlling system was very interactive because the aim was to understand the organization and to see their costs. A lot of things

emerged; for example accounting errors... and then we resolved them... finally somebody is looking at these. ... The compilation of data was interactive; obviously controlling reacted to these sensitive areas, where to provide more precise data. '(FGI)

In today's financial environment, the strategic thinking is very rare, the innovative approach is insignificant. There are few best practices: the department leader is actively involved in the strategy planning and budgeting, and the top manager does not deal with operational tasks but he focuses on the future and management of hospitals by way of quarterly financial reports. The department leaders are informed about professional work. The lack of identified managerial goals and values is the barrier of the effective use of controls in hospitals (Abernethy 1991) so the platform of strategic planning and budgeting provides opportunity for middle and top managers to communicate, to think together and to improve the joint work – with the co-departments and the financial/controlling unit – and to highlight the need for management information.

IV.5. Summary

The results of international research show that managers prefer diagnostic controlling systems and financial information. The top management with medical-professional composition will be more inclined to apply non-financial information and more interactive controlling device in decision-making [Naranjo-Gil – Hartmann, 2006]. This is explained by the doctors in managerial positions (focusing on professional norms and values) tend to efface cost information. The further down in the hierarchy and closer to the clinical decisions, the looser couplings are between budget and action, clinician managers define control processes as an informal and 'hidden' processes [Nyland – Pettersen, 2004]. The hospital managers should understand the role and motivation of doctors [Kuntz – Scholtes, 2008] and should encourage them to use the economic information. Doctors are basically willing to accept the economic criteria in clinical decision-making, but professional, medical and ethical criteria will always remain at a higher level [Ferreira Da-Silva et al., 2012].

In my research I have examined, through individual and focus group interviews, the need for information of leaders at various levels (top and middle management) and the

style of information usage. For all this I used information categorization by Bouwens – Abernethy [2000] and definitions of diagnostic and interactive control from Simons [1995].

Top managers typically put emphasis on financial information, and mostly historical data is examined through a lens that highlights management improvement measures (currently cost-reduction at the most). There is only a small number of future-oriented hospitals, despite them having some kind of strategy and development plans. As a result, long-term thinking is rare. In this context, the role of the owner/maintenance (AEEK) raises another question: since the development of strategies is not supported by a unified framework for the hospitals, the managerial need for strategy, even if there is one, is overshadowed by a lack of resources. The medical leaders tend to make professional decisions. The data sent to them often contain short-term economic balances, revenue and cost data, but typically non-financial indicators are dominant (e.g. number of cases, hospitalization length, bed occupancy, emergency cases etc.). The use of data in decision-making has a more diagnostic aspect: only a few people use or used interactive control system due to the absence of strategic thinking. The data generated by controlling clearly serves a more stable management. But leaders often do not understand the management information or do not recognize their importance. The information and their utilization also highlights the need for a more powerful controlling system but internal communication, skills development and training makes the application of controlling or the interactive controlling available. Considering all of this, the use of controlling depends on top management attitude, socialization and management knowledge. The more the manager knows this information and their uses, the more the controlling system develops and supports him in decision-making.

The meetings of top management and physicians provide an appropriate forum for the exploration of common problems. But in addition to medical profession issues, the economic aspects should also be given importance to. In many institutions the physicians do not understand the role, data and content of controlling reports, for which the only solution is the joint work of economic and medical units. Several top and middle managers question the validity of data, typically costs but the answer is, again, the development of controlling systems. There is more opportunity in controlling but to explore them, widening and sharing knowledge and the adoption of the systems are all essential.

V. NEW SCIENTIFIC RESULTS

The new scientific results based on three interdependent and hierarchical pillars are the following:

- 1) new approach to controlling components with path analysis method,
- 2) internal role of decision support functions in health care system,
- 3) use of controlling data and their characteristics in the different management hierarchy.

1) New approach to controlling components with path analysis method

1.1. The results of research confirmed that in those cases where the statistical methods assuming classical normality cannot be used because of the nature of the data SEM-LVPLS clearly reveal relations between the variables by checking if the constructed model is good. In addition, the planning and analysis patterns were also described with simple statistical indicators.

1.2. I was the first to determine the relationship between controlling elements (environment, planning and analysis) arranged in statistical blocks, using the IBM SPSS software. With the graphical results, the context of the overall controlling system was demonstrated clearly and in a way easy to comprehend.

1.3. This analysis was the first to prove that:

- The institutions choose the indicators describing the controlling environment similarly, and these have great influence on planning (0.54) and reporting (0.83).
- The full impact between analysis and environment (on the environment-planning-analysis path) is 0.49, which is much higher than the direct environment-analysis effect (0.04). This means that the analysis is not directly affected by the choice of the environmental elements but through the planning it does have a significant impact.

1.4. As an impact on practice, I point out that

- The institutions typically do performance planning; but in case of revenues, costs and results, the analysis prevails.
 - The institutional dimensions vary considerably from department-level activities out of which planning and analysis have low frequency and very high deviation.
- 1.5. As a future research agenda, I mark the exploration of the reason of result of path analysis. Later (in chapter III.), I partly present it in the context of controlling thinking. The relationship between the quality of controlling activity and the management of institution (most of all the economic balance) is examined further research area but to find an adequate methodology is a huge challenge, knowing the specialities of Hungarian health care sector. And so:
- exploring the planning deficiency and preparing proposals for solutions;
 - analysing the reporting systems and feedback management;
 - impact analysis of standardizing controlling activity, named in SROP 6.2.5-B-13/1-2014-0001.

2) Internal role of decision support functions in health care system

- 2.1. Involving groups affected directly by health controlling systems, I did individual and homogeneous focus group interviews. I confirmed that the most important opinions and attitude of the participants, based on their honesty, are identified by the structured processing (by Verbi MAXQDA 12 software) of qualitative information – in addition to conventional processing –and by it the research questions are refined effectively.
- 2.2. I presented, for the first time, in my research that a centralized health care environment affects the institutional controlling systems, and even modifies the decision support and management. With tools of qualitative research, I defined the management and the planning (missing element of controlling function) and highlighted the influence of external factors.
- 2.3. Study identifies the following neuralgic points, which are also the practical results of the research:

- Currently, controlling is a retrospective analytical tool, and has a ‘Jolly Joker’ function for all kinds of institutional ad-hoc tasks instead of the classic controlling function.
- Due to under-financing and soft budget (debt consolidation), managers’ approach to financing became excessive thus depreciating controlling.
- Unbalanced financing rates between medical professions cause internal tension and disinterest in medical management.
- Due to the performance limitations, the excessive emphasis on budgeting leaves no room for the application of controlling approach and its tools, which could be a modern management tool, taking into account the quantitative and qualitative standard of patient care.
- Financial security of the activities is required to compose a sustainable professional structure, but institutions only know approximate values.
- Reduced financial resources hinder the operation of the motivation system, driver of the whole system.

2.4. Paradox of a devaluing controlling system: the environment expects a strong use of controlling tools (cost and coverage calculation, capacity and benchmark analysis, motivation systems), but the devaluation of hospital controlling system is still identified. The financing approach is in the thinking of hospital managers: they are seeking to achieve the economic stability by maximizing the financing revenue, maintaining the liquidity and lobbying for the bailout.

2.5. In the examination of the relationship between health care system and controlling systems, a wide range of future research areas have been described, the most outstanding are:

- examining the complex extension of control functions, e.g. as a maintaining tool or a policy device for coordinating different level of patient care;
- the retention of the complex interest system and its solution proposals can also contribute to the balance of the sector;

- human resource planning and management is poor or does not function, while the retaining and encouraging of emigrant practitioners has importance in health care;
- reducing the phenomenon of soft budget constraints is a continuous dilemma in healthcare, so exploring its tools is an excellent field of research;
- the building of knowledge base and its sharing in the field of health care management may result a further interesting research.

3) Use of controlling data and their characteristics in the different management hierarchy

3.1. The homogeneous focus group interview conducted with controllers confirmed that the application of the controlling system is essential in managerial decision-making, but its advantages and disadvantages is hardly known among the top managers and less among medical managers.

3.2. Analysing interviews and focus group discussions, I pointed out that management information system data has narrow scope; typically data examining the past that support short-term and financial thinking and use internal information.

3.3. The weakness of management information practical application is the financial perspective; different knowledge and interests; and personal management approach:

- Top managers typically require financial data. They deal with performances and revenues, and do not consider cost data as valid.
- Medical managers make professional decisions that focus more on patient safety and quality. Performance monitoring has been included in their approach but financial data are neglected depending on needs of top managers.

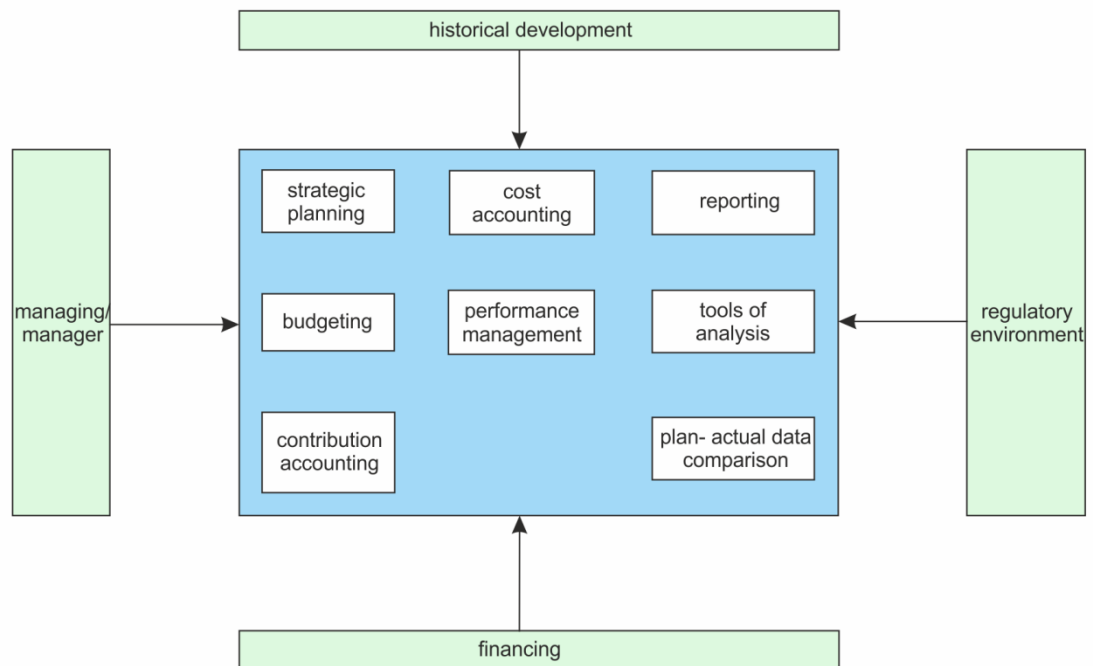
3.4. In the majority of institutions, diagnostic system was developed, whose main function is performance distribution and monitoring, in addition to strong financial control.

3.5. The decision support and use of controlling information include further research possibilities:

- the medical thinking about controlling could be deeply explorable by using case study methodology in a selected profession;
- the operational mechanism of the motivation and controlling system in public and for-profit health care institutions is comparable and the possibility of transposing best practice can be examined.

VI. SUMMARY AND CONCLUSIONS, CONTRIBUTIONS TO THE FIELD

Several researches were made in the field of international health management and controlling, whose necessity are indisputable because of the continuous decreasing of resources and cost-containment in health care. The Hungarian health care studies affect the management area, partially [Kiss 2014, Révész 2014, Stubnya 2010] or entirely [Dózsa 2010, Takács 2012], but none examine especially the controlling systems. In the literature, due to few publications in the topic, I tried to fill this research gap with this thesis. I revealed the controlling system in Hungarian health care medical institutions and analysed the information requested in management decisions and the use a broad range of styles.



15. Figure: Framework of the research (own figure)

The components of controlling system and its context with the health care system contain the research framework. The institutional controlling system and its components are based on a statistical analysis (questionnaires completed by ÁEEK hospitals),

national controlling literature and qualitative research element. The dilemmas and questions emerged in the statistical analysis was built into the questions of the interviews. The sampling of qualitative research affected the entire hospital population (specialized hospital, clinic, university hospital, rehabilitation institutions, small town hospital etc.). The findings hiding in numbers of controlling system extended the framework to consider a broader context of the health system constituents. This context consists of a historical outline of the controlling development, management and the manager, the regulatory environment (legislation, owner expectations, tools, etc.) and financing. The financing is part of legislation, but because of the resources largely determine the operation of the hospital and the attitude of the managers concerning adoption, application of controlling, therefore it is a separate category.

VI.1. Summary of research results in the level of health care institutions

Management and attitude of the manager

The interviews of maintainers and managers confirmed that the management of state hospitals basically pays attention to the use and cost-effective allocation of resources. A regard of the management system, the management accounting system and the managerial knowledge of the leaders are already very heterogeneous. Some of the top managers do not apply controlling, do not use decision support systems; information is in the head of manager; as experts say: they manage from 'heart-pocket-booklet'. According to the interviewees, who cannot or do not well operate controlling system, the management has the need to use controlling data, but has personnel, information technology, validity (most importantly in terms of cost) and other problems.

Hospitals have very specific financial management tool, the management framework bases on liquidity, debt balance, special budgeting rows monitoring and PVL allocation. It is explained by strong revenues focus with a continuous performance monitoring, since the reach of the maximum revenue is considered by managers. These management tools supplement controlling system; its use depends on managers' attitude: behaviour, socialization, expectations and knowledge of top management.

Use of information depends on managers, but there are differences between the usage of top and departmental managers, too. The top managers typically require financial data, deals mainly with revenues and performance. The medical managers take professional decisions focusing in patient safety and quality. In the void of motivation system, there are not financial expectations against department leaders; and so it has no consequences.

The role conflicts are clearly displayed on physicians: in decision of a medical manager the professional and management/financial approach are also included. But for physicians, the medical professional aspect is always stronger reference to ethical (Hippocratic Oath, bottom-elected leader) and medical standards. However, the management approach enhances very slowly to the medical managers, of course they are definitely under pressure. Unfortunately, many department managers cannot interpret the current data and indicators; adaptation was without them and/or incorrectly communicated. For them, it is important always to communicate that decisions of health care cannot and do not based solely on financial data, but in addition to the other factors should also be considered. It will slowly result a change of thinking; as happened in the for-profit health care institutions.

Despite of establishment of accrual accounting approach instead of governmental accounting, the hospital's management turned into financial approach. Among the managers, the liquidity, debt balance and PVL allocation monitoring are very typical management tool. For several years, the joint responsibility of centralization, the under-financing and its government solution (bailouts) result the softening of budget constraints. This approach makes to fall the controlling, and it is even more needed the information of accurate coverage of cases for selecting the appropriate professional portfolio. Instead of using the controlling devices, the hospitals try to maintain the financial balance with optimization of PVL and so, revenue. The department-level cost and coverage calculations – which would allow for prioritizing professional and processes, determining the optimal professional portfolio – operate in few institutions. Moreover, appropriate costing methodologies have been in Hungary, too.

The devices of institutions employing controlling follow a diagnostic approach; due to the absence of planning, controlling means more follow-up data analysis and evaluation. Future and strategic thinking is required to interactive control: even if

diagnostic tools are used. For developing the use of interactive control system, it is extremely important to involve medical managers to the strategic planning and budgeting; the problems to be solved and opportunities could be surface. Last but not least the strategic thinking of governmental owner would be likewise priority task.

Regulatory environment: nationalization and bailout

As a result of the 1990 years health care reforms, the central government control has been replaced with decentralization, and the local government system remained – with a minor change – till the year 2012, when the hospitals have been again nationalized. The hospitals have moved under a managing and professional centralized institution. The nationalization of the institutions have different meanings: (1) common ownership, (2) a common administrative rigor: data services, administration and monitoring tools, (3) sensitive area driven by politics and personal relationships, and (4) unexplained joint problems and untold or hidden expectations. The owner charges hospitals with significant administrative tasks, which arise from legal obligations and from information need of centralization. The nationalization result a shared responsibility – looser than in local government system – for hospitals: health care providers do not pay their suppliers and are lobbying for support or bailout. The debt settlement system does not support the optimal allocation decisions [Langenbrunner et al., 2005]. Kornai [2009] used the formulation of ‘self-generating process’; when many hospitals expect to bailout, this troubled hospitals are saved, then they will expect it. The SBC is a mental phenomenon, particular decision maker's expectations, beliefs of the bailout [Kornai, 2009]. Nowadays, the financing of hospital debt is the required element of the system; hospital managers expect its payment, at the end of the year. Debt consolidation affects to the use of controlling system, through changes of managers’ attitudes (see tools introduced earlier).

Process of financing in aspect of health care institutions

The health care is technically financed by National Health Insurance Fund of Hungary (hereinafter NHIFH), as the central service purchaser; basis of German point system in outpatient care and Hungarian Diagnosis Related Groups (hereinafter HDRG)

and length of stay in case of inpatient care [Orosz – Burns, 2000]. The financing system is criticized, but not in respect of the financing technique, rather low financing, performance constraints and disparities between the professions. All of these accumulate and scrolled deficits in the system. Because of the underfinancing, 50-70-100 billion EUR/year is missing from health care system, according to interviewees. (In 2013 the reduction limit of the budget was 15%, and hospitals budget or PVL still have on this level). To achieve additional funds, the managers concentrate to increase PVL level by his lobbying power.

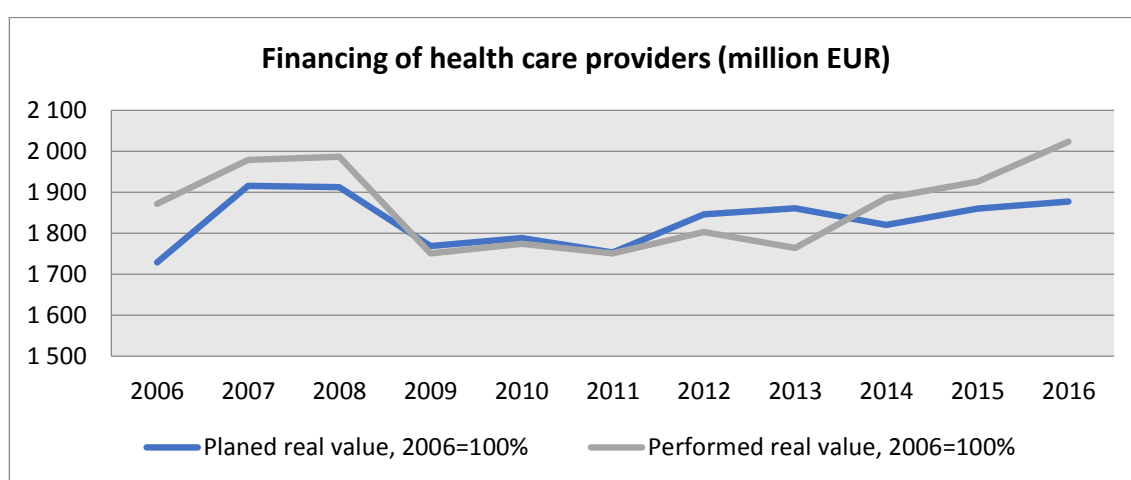


Figure 16: Financing of health care providers between 2006 – 2016 (source: www.neak.hu)

Since the introduction of performance financing system, the weighting factor of HDRG has not changed and HDRG revision has not happened, however the change of medical technology or cost ratio require it. These resulted the separation of profitable, ‘high-paying professions’ (oncology, cardiology) and deficit-making professions (surgery). Therefore, hospitals are ‘trying to provide just slightly loss care, and increase performance as far as possible, often without or not well functioning devices of controlling.

A result of ‘debt consolidation’s phenomenon’, centralization and financing anomalies, controlling systems devaluated in the hospital, despite the information of professional activities’ coverage is even more needed for the election of a sustainable structure. Instead of controlling devices, hospital managers focus on financial

perspective and they use liquidity monitoring and lobbying for bailout to achieve economic stability. Thus, the current hospital's controlling system— if exist – essentially finance-centric. Many institutions only deal with performance analysis, department-level controlling poorly works, patient-level controlling and modelling does not function.

Historical formation and development of controlling systems

The health care system has a direct impact on institutional controlling systems, as it has been previously presented in the literature. The requirement of management sciences and controlling systems arises with the introduction of HDRG financing and the project of World Bank. In the early 1990s, a pioneering hospital began to design and build controlling systems for improving the hospital outcome with expansive tools. Seeing these results, from the early 2000s, controlling devices dynamically spread and intensively use until the introduction of PVL. During this growth period, the hospitals with controlling and/or motivation systems planned and analysed (plan-actual data comparisons were made), in order the increase of performance and revenues. PVL, as a high-income stop, put an end to this process, and moreover, due to the continued declining of the financial resources, hospitals could not continue to operate the motivation systems. Therefore, the using of controlling is limited and transformed: it has a financial approach, which leads to fall of controlling; although regulatory environment, the decreasing resources and financing further request the use of decision support tools.

Application of controlling systems

In the introduction of Hungarian controlling literature, the leaders typically do not know the international controlling directions and methods, therefore the controlling definition is specific, come from hospital practices. The hospital controlling partly matches with topic of profit-oriented controlling, but much more superficial. The leaders identify controlling as device of decision support and intend a strong role for it; in turn it has no or limited function in most hospitals. The institutions are using external

experts, in case of lack of controlling capacity or specialized knowledge, primarily to optimize performance and to prepare benchmark analysis. Its advantage is that consultants have much broader range of information and practical experience.

The decision support or controlling unit often 'merges' with the finance departments, or in smaller hospitals one department/person does these functions. In the beginning, the controlling tasks were connected to financial function. After, due to changes in legislation, ownership data and reporting requests, etc., controlling is expanded with non-classical controlling function. The controller performs not only the tasks of financing and controlling, but also all kinds of other analyses, ad-hoc tasks for managers and maintainers. He/she has become a key player with a priority function, it can lead analytical, data service and 'everything that is about money is passed to controlling': controlling has a Jolly Joker function and has become a valuable role in hospital.

According to the definition of interviewees, controlling is basically an approach, an analysing method of the institutional operation. In the thinking of public hospitals, the controlling is a retrospective, past analytical tool, not providing rapid response; practically tasks are the register and data processing, rather than the planning, forecasting and feedback. The financing, coverage calculations, and often the operation and monitoring of budget rows are required.

The hospitals with controlling improved these functions and the coverage of medical cases and professions, definition of capacity and various scorecards and feedback are displayed. These information base the 'artistic coordination of the whole system'.

One the face of it, the formula is simple: selection of well-financed and covert procedures, setting capacities and tracking indicators. However, many professions and thousands of procedures form a complex system. But to know the coverage of procedures is not enough, because even the "side effects" of a loss-making medical treatment can be the use of a profitable procedure or treatment of a patient and the subsequent treatment of another problem can also be economically effective for the hospital. Controlling performs the 'artistic coordination of the whole system'.

Controlling systems and their elements in the health care system

The processing of Hungarian controlling literature, I highlighted of the planning gap and confirmed and presented in detail the planning and analysis activities, with simple and multivariable statistical study. The characteristics of planning and analysis blocks confirm the deficiency of the controlling system; the environmental block is not enough for encouraging the need of controlling system, even though the control process were similar to textbook definitions.

The importance of analysis and planning varies in hospitals; moreover institutional-level tasks (mainly analyses) have greater importance. The semi-annual/annual planning and analysis features, but because of the very high standard deviation 'no planning/analysis' is also common. The institutions focus on performance and revenues; costs and profit/coverage are less important. Just a few hospitals emphasize the department-wide planning and analysis. The diverse data collection, planning and analysis practices let us conclude to diversity of institutional environment and controlling interpretation. Their reasons could be the diversity of managers' knowledge and lobby power, as well as the providing obligations and professional palette.

The classic budgeting in hospital could mean several type of planning; balanced budget for the owner, and management supporting 'controlling budget', which is a real forecast for the management. The reason of the preparation of two separate budgets is the low source for hospitals, approximately in the 2012 year PVL-level. The planning elements of controlling exhaust in costs defined by personal status and some budget row planning. The personnel costs can reach 60-70% of the total hospital budget; but human resource planning and managing does not occur.

In the budgeting process, the head of department and top management agree with the criterions of operation, they measure it and do feed-back. In case of hospital budgeting, there are no agreements and negotiations, and due to low hospital budgets, the budget rows are unenforceable. But *'very big mistake of the public hospitals is the use of the budget row control, because the more important is the optimization of PVL. For it, they have to know the profit of the product'*. The controlling type of budgeting includes the

annual planning of department/physician/ICD¹⁶ groups/diagnoses, with observing expected number of cases and changes based on historical data. Due to the classical budgeting, the hospitals, heavily relied on the controlling data – typically for-profit institutions – could/can to manage effectively. The motivation system was prominent component.

The uncertainty, legislative changes and continuous re-planning and under-financing generated the marginalization of classic budgeting function. These are much larger problem, than the existence of performance volume limit.

Dilemmas and suggestions on level of health care institutions

Manager of organization is responsible for the design of the organizational structure, the coordination of processes and definition of duty list [Dobák - Antal, 2010]. In contrast, the primary goal of most hospital manager is to lobby sources for the provide health services to owner, financial agencies and professional organizations. The phenomenon of SBC and debt settlement (particular decision maker's expectations, beliefs of the bailout) is forming strongly the attitude of leaders. As [Kornai 2009] composes 'the stronger the hospital manager's position is in relation to the hospital's superior organizations, the insurer providing the funds and the institutional owner providing the subsidy, the greater the hope of rescue.' As an annually practice, the financier/maintainer is providing funds to settle hospital debts, to reduce supplier debts and to reduce the waiting lists. As long as the anomalies of health care system (sustainability and predictability) and void of motivation system (involvement and accountability of top management and medical management) exist, while the function of controlling systems may not use.

The controlling supports those managers, who form hospital to *work organization* (re-designing and organizing of departments, works, processes and institution) and manage the institution by design, organization and management principles. In this case,

¹⁶ International Statistical Classification of Diseases and Related Health Problems

the leader has to take decisions with full of conflicts; the controlling is essential device for support and validate the decisions.

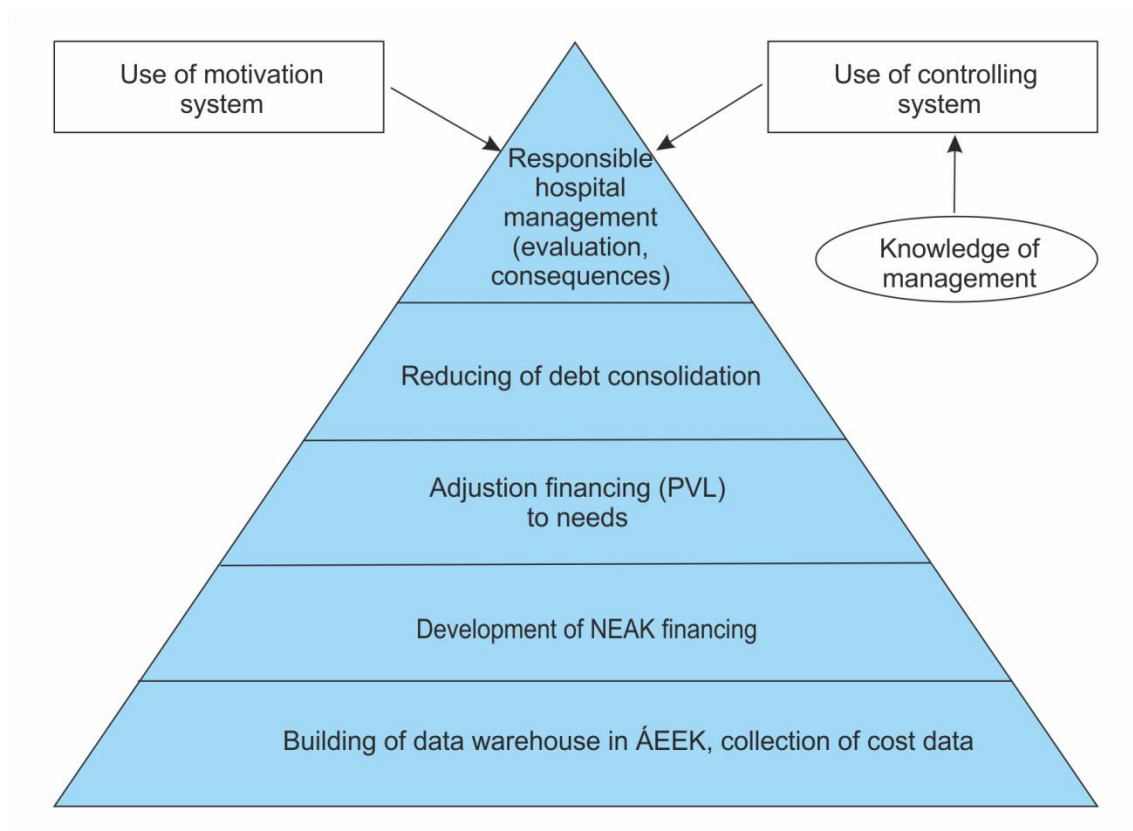
On institutional level, controlling approach is critical for usage, which can be achieved with common development and internal communication. The common development may include validation of expenditure data, creation of internal and external benchmark reporting system, creation of indication system, application of modelling, etc. Of course, it is also essential for competence development and training of managers and controllers, expansion of management knowledge and competence.

The coverage calculation provides an opportunity for prioritizing successful profession and process, determining the optimal professional palette which is supported by costing methodologies.

On government level, the financing settlement is the adequate tool for the treatment of health care problems, concerning to controlling system, with increasing financing allocations, and settlement of professional disparities. So we return to the necessity of institutional cost and coverage calculations, since it is possible to determine the rates and cost-based of HDRG. The system could only be sustainable with the preventing of deficit reproduction. The building and operation of motivation systems is part of the management tool. These requires an evaluation system, accountability, monetary and non-monetary rewards or sanctions for the top-managers; at the institutional level, leaders also must obtain the conditions and accountability of organizational operation, ensure opportunity of adequate remuneration.

VI.2. Dilemmas and possibilities on policy level: regulatory environmental effect on the controlling system

The policy has a strong impact on the life of health care institutions in terms of regulation, funding and day-to-day operation. One of the determinative and permanent problems for institutions is to overcome uncertain and unpredictable environmental impacts. These typically derive from the changing regulation of policy: ‘In the past decade, if financing changes happened only three times a year, it was a quiet year. It is not worth planning because there are heavy uncertainties and no future information.’ Institutions require strategic and operational guidance, secure regulation and (well) communicated information. The following figure summarizes the possible actions of the policy, which create a more predictable environment for hospitals.

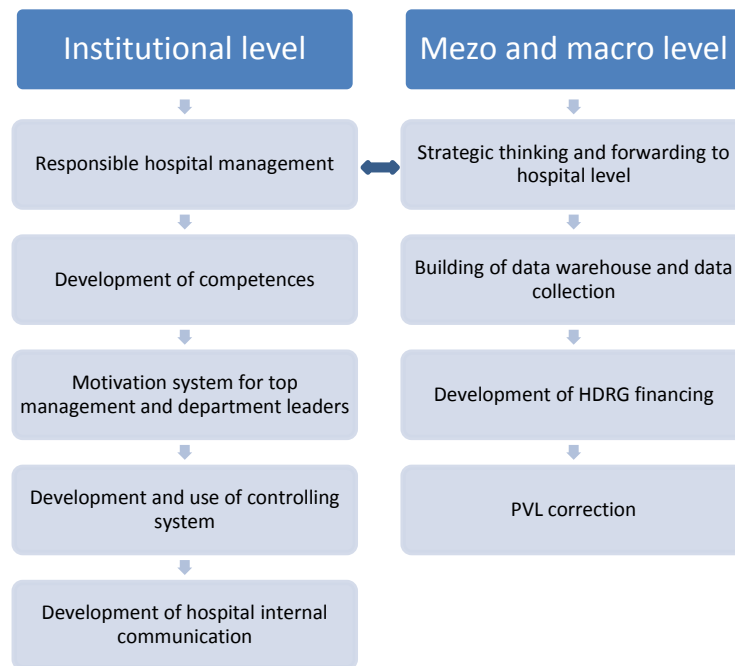


18. Figure: Developing mechanizm of health care system (own figure)

At government level, development of financing is an adequate tool for managing healthcare problems affecting hospitals management. This means raising both the funding budget and the disparities in the professions. The elimination of various source injections and debt consolidation is necessary, but it is not a sufficient condition to restructure the financing environment: change of managerial thinking also essential in the hospitals, which can be supported by establishment of a consistent evaluation and motivation system. Kornai [2009] adds that 'the ambivalence in hospital-manager behavior is partly explained by ambivalence in the relation between the hospital's financial crisis, the bailout, and dismissal/appointment of managers responsible.' The objective and consistent use of management evaluation system could allow hospitals to operate economically and not to accumulate debt (all actor confirmed the under-financing of the sector).

The criterion of financing development is the knowledge of average cost of health interventions. ÁEEK may be able to produce adequate data based on the requirements of the national controlling regulations and NEAK's previous data collection experiences. The available data warehouse (Sectoral Statistical Data Collection System) of the owner can be used to store, process and analyse the cost, revenue and coverage data of public hospitals (although the human and operational conditions of the system are a challenge in environment of public officer). The average cost data will highlight the differing institutional costs and the deviation from financing. In addition, features such as economies of scale and efficiency of institutions or departments can be explored. It will also address issues such as the controlling operation of smaller institutions: it is worth thinking about creating a decision support team at maintainer or regional level, which can support institutions and local managers through methodology, analysis, sharing of experiences.

Last but not least, the Figure 18 resumes the results of Figure 16 and 17 and presents the different elements of the thesis contribution as a hierarchy from the most important to the least important.



19. Figure: Summarizing of thesis contribution (own figure)

By my thesis, I wanted to describe the patterns and the use of controlling system in Hungarian health care institutions (mainly hospitals). But the complet and enjoyable interviews encouraged me to embed it to the health care system, which is interwoven with special interest system. And this is the key for understanding the operation of health care system, managerial thinking and decision support system.

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VIII. APPENDIX

VIII.1. International definition of management control

According to Strauss - Zecher (2013), the authors (Merchant - Van der Stede, Anthony - Govindarajan and Simons) of three top-ranked textbooks provide similar definitions of management control systems but fundamentally differ in the interpretation and focus of management control that generates the variability of definitions. The first definition states that management control is *'the processes by which managers assure that resources are obtained and used effectively and efficiently in the realization of the objectives of the organization'* (Antony, 1965 cited by Strauss – Zecher, 2013). Therefore the earlier interpretations have been expanded. The first publications (1980s and 1990s years) interpreted management control systems as a decision-making tool apart from Anthony; Baiman (1982) *'linked decision-making with control but still kept a focus on information for decision-making'*. Accordingly, he *'distinguished three different interpretations of information application'*: (1) belief revision regarding future expenditures of managerial plan, (2) motivation, and (3) resource allocation between departments and decentralized entities. (Strauss – Zecher, 2013)

According to the definition of Merchant – Van der Stede (2007), *'management control includes all the devices or systems managers use to ensure that behaviors and decisions of their employees are consistent with the organization's objectives and strategies'*. There are three main reasons for the necessity of control: (1) the lack of direction, namely how the employees should maximize their participation in the achievement of organizational goals (2) motivational problems deriving from the differences of personal and organizational goals and (3) personnel limitation originated from the lack of intelligence, training, experience, persistence, knowledge or information.

The interpretation of Anthony - Govindaranjan (2009) reflects that management control is *'the process by which managers influence other members of the organization in order to implement the strategy of the organization'*. These definitions represent *'command and control'* perspective but *'innovation and control'* approach (Simons 1995) gives the definition of *'the formal, information-based practices and procedures used by managers so as to maintain or alter the patterns in organizational activities'*. In

his levers of control (LOC) framework, four control systems – beliefs (e.g., core values), boundary (e.g., behavioral constraints), diagnostic (e.g., monitoring), and interactive (e.g., forwardlooking, management involvement) – work together to benefit a firm (cited by Widener 2007).

Most authors (Malmi - Brown 2008, Herath 2007) have started to use the name of ‘package’ because the focus of management control has already moved towards to the control approach. ‘The basic processes of control – planning, operation, measurements and evaluation – operated in these control systems may be presented in quite different configurations as explained by Flamholtz (1983). For example, there is even a ‘control system’ that consists merely of a planning system with little else (Flamholtz 1983). Another example: the control system may include two or three processes of control or may consist of all the four processes’ (cited by Herath 2007). Accordingly, the level of control may also be different depending on the number of control factors.

Management control is continuously broadening from simple definitions to complex models and package approaches since systems have taken increasingly the distinctive aspects such as organizational behaviour, cultural values etc. into consideration. The dominance of information approach supporting decision-making was taken over by the spread of control, this way for example remunerating and compensation systems were connected to it.

VIII.2. Questionnaire for focus groupe

Use of management information and controlling – questionnaire

1. Identification of key leaders

Who is the key stakeholder of hospital management in terms of decision-making mechanism (according to positons)?

Key leaders	Why?

2. Definition of managerial level

3. Characteristion of hospital management (decision forum) – personal vs. management team

Management decision¹⁷ are typically: personal or team decide

- members of team¹⁸:
.....
.....
.....
.....

¹⁷ According to the practice, not the legal and other definition.

¹⁸ Please arrange according to power/respect.

Please fill the following table, which can be extended with the management team members and/or other leaders.

	Use of information ¹⁹ 1-5	Education ²⁰	practicing	other remark
General Director	1-2-3-4-5		y - n	
Medical Director	1-2-3-4-5		y - n	
Financial Director	1-2-3-4-5		n	
...	1-2-3-4-5		y - n	
...	1-2-3-4-5		y - n	
Head of.... department	1-2-3-4-5		y - n	
Head of.... department	1-2-3-4-5		y - n	
	1-2-3-4-5		y - n	
	1-2-3-4-5		y - n	
	1-2-3-4-5		y - n	

4. Obtaining managerial information – Information points in the organizations

Which units provide information in the organization to the management decision-making?

Function or unit	Definition of information

5. Use of management information

In your opinion, what kind of information do **top managers** require? Check it.

- | | |
|-----------------------------|-----------------------------|
| - past-oriented information | future-oriented information |
| - internal focus | external focus |
| - financial | non-financial |
| - short-time oriented | long-time oriented |

For what do the top managers use the accounting information?

- explain the difference between the budget and costs,
- cost expansion for differences between budgeting/activity,
- making more realistic budgeting/activity,
- reporting and analysis, as background for discussing and implementing activities,
- budget, as a guideline for planning daily activities,
- for planning of next year activity.

¹⁹ What extent does the manager use information? (1- barely, 5- teljeabsolutely)

²⁰ What kind of education has the members? Physicians are practicing?

In your opinion, what kind of information do **middle managers**²¹ require? Check it.

- | | |
|-----------------------------|-----------------------------|
| - past-oriented information | future-oriented information |
| - internal focus | external focus |
| - financial | non-financial |
| - short-time oriented | long-time oriented |

Are the following issues typical to the medical leader regarding the use of information?

- setting up goals and settlement,
- data assumption and discussion of action plans,
- appointment of key strategic areas for development,
- new ideas and solving methods for the task assigned,
- participation in consultation with others,
- learning tools.

Do you think that the leaders on the different managerial levels use the information in different ways? If they do; how and in what way?

.....
.....
.....
.....

What is the reason of the different use of information?

.....
.....
.....
.....

²¹ Medical leader: manager, who still practice in health care (head of medical department, clinical managers, or medical director, etc) besides of practice

VIII.3. Questions of the interviews

Interview questions for experts and managers

Controlling and decision support

1. Who deals with decision support in the hospital?
2. What does controlling mean in the life and practice of hospital?
3. Which tasks does controller, controlling unit or other decision support?
4. What devices do top managers and middle leaders use?
5. How controlling affect to operation and decision-making? Why is good to have controlling?
6. How does an ideal or expected controlling work?

Results and questions of statistical surveys

7. The simple statistical analysis of the selected variables showed low mean, high standard deviations, and extrem mode; normal distribution is nowhere to be found. What is the reason of this phenomenon?
8. Why the institutional planning and analysis has more importance?
9. Do the institutions plan and analys?

Questions concerning to top-managers:

10. Do the managers deal with management information or controlling? ... What determines the inquiry of the manager?
11. Does the top manager (or team) take the decision? Which information and factors are taken into decision-making?
12. What information does require more: financial or non-fiancial?
13. For what does the manager use the accounting information?
14. What kind of accountability is on departmental level, in case of fiscal differences?
15. How often and in what way are they related to controlling (financing) unit?
(Daily, weekly, monthly and meetings, phone, e-mail, reports)

Questions concerning to medical leaders:

16. Which information and factors are taken into decision-making on the medical leaders' level?
17. What information does require?
18. How often and in what way are they related to controlling (financing) unit?
19. Does the medical leader consider the financial or economic consequences in clinical decision?
20. How could the leader use the financial, budgeting and performance information?
21. What is the leader's decision-making power?
22. For what does the leader use the budget?
23. Are there any consequences if the medical leader exceeds the budget?
24. Do you see the role of conflict (dilemmas between economic and professional decisions) in attitude of medical leaders?
25. For what the leader typical use the information?

VIII.4. Manifest variables and labels used in SPSS program

Environment – design of data	
profit calculation in accrual accounting aspect (on department or activity level)	üzemgazd_erszam
collection and recording of actual performance data of departments	ténytelj_gyűjt
collection and recording of actual revenue data of departments	ténybev_gyűjt
collection and recording of costs of departments (cost centre)	ktg_gyűjt
cost rows budgeting on institutional level	keretgazd_int
cost rows budgeting on department level	keretgazd_szerv
controlling department or job in the hospital Y/N	kontrollig szerv
controlling function Y/N	-
making profit calculation Y/N	üzemgazd.ered.
NHIF revenue is calculated to departmental codes Y/N	OEP er. szakmakódra
Planning	
Planning of institutional performance (physical indicators) planning	natur_int_terv
Planning of departmental performance (physical indicators) planning	natur_szerv_terv
Planning of institutional revenue planning	bev_int_terv
Planning of departmental revenue planning	bev_szerv_terv
Planning of institutional cost planning	ktg_int_terv
Planning of departmental cost planning	ktg_szerv_terv
Planning of institutional profit in accrual accounting aspect	er_int_terv
Planning of departmental coverage and profit	fedezet_szerv_terv er_szerv_terv
Institutional expected profit calculation in mid-year (prognosis)	prognosis_int_terv

Planning of case mix index (separating high-value intervention)	CMI_terv
Analysis	
Comparison and analysis of institutional plan-actual performance data	telj_int_el
Comparison and analysis of departmental plan-actual performance data	telj_szerv_el
Comparison and analysis of institutional plan-actual revenue data	bev_int_el
Comparison and analysis of departmental plan-actual revenue data	bev_szerv_el
Comparison and analysis of institutional plan-actual cost data	ktg_int_el
Comparison and analysis of departmental plan-actual cost data	ktg_szerv_el
Comparison and analysis of institutional plan-actual profit data	er_int_el
Comparison and analysis of departmental plan-actual profit or coverage data	er_szerv_el
Analysis of case mix index (separating high-value intervention)	CMI_el

VIII.5. 'KO1. Controlling basic features of the institution according to the 2013 practice' questionnaire

Kitöltési útmutató:

Kérjük, hogy töltsse ki a táblázat 'Válasz' oszlopában szereplő szintelen cellákat a **2013. évi** gyakorlat alapján. Szükség esetén az Ön által fontosnak tartott információt a megjegyzés rovatban adja meg. 'Egyéb' válasz esetébe, kérjük, mindenképpen használja a 'Megjegyzés' rovatot.

#	Kérdés	Lehetséges válaszok	Válasz	Megjegyzés
1.	Van-e az intézményben kifejezetten kontrollinggal foglalkozó (belső) szervezeti egység és/vagy munkaköri pozíció?	a. Igen b. Nem		
2.	Amennyiben igen, akkor...			
	... a szervezet megnevezése:	n.k. -> Nincs korlátozás		
	... a munkakör megnevezése:	n.k.		
	...munkatársak száma (osztott munkakör, vagy részmunkaidős foglalkoztatás miatt tört szám is lehet):	n.k.		
	...munkatársak szakképzettsége (az előzőekben jelzett létszám összes munkatársának felsorolása):			
	orvos (fő):	n.k.		
	ápoló (fő):	n.k.		
	közgazdász-gazdasági végzettségű (fő):	n.k.		
	informatikai végzettségű (fő):	n.k.		

	a fentiekből egyszerre több végzettséggel is rendelkezik (kérem, sorolja fel a párosításokat a megjegyzés rovatban):	n.k.		
	egyéb diplomás (kérem sorolja fel a megjegyzésben a végzettségeket):	n.k.		
	egyéb, diplomával nem rendelkező munkatárs (kérem sorolja fel a megjegyzésben a végzettségeket):	n.k.		
3. Amennyiben nem, akkor...				
	...folyik-e bármilyen - a definícióhoz illeszkedő - kontrolling tevékenység?	a. Igen b. Nem		
Amennyiben zajlik kontrolling tevékenység, akkor...				
	...ki végzi?	n.k.		
	...melyik szervezeti egységben történik?	n.k.		
4.	Készítenek-e üzemgazdasági* eredményszámítást?	a. Igen b. Nem		
5.	Ha készült üzemgazdasági eredményszámítás, akkor az (a) osztályokra, szervezeti egységekre** vagy szervezeti csoportokra; (b) tevékenységekre, szakfeladatokra vagy OEP kasszákra; vagy (c) az előző kettő kombinációjára történik-e? (d) egyéb megoldás, kérjük, fejtse ki a megjegyzésben.	a. Osztályokra, szervezeti egységekre vagy szervezeti csoportokra b. Tevékenységekre, szakfeladatokra vagy OEP kasszákra c. Az előző két lehetőség kombinációja d. Egyéb megoldás		

6.	Ha OEP kódokra készült az eredményszámítás, akkor az egy OEP kódon belüli szakmakódokra készít-e külön eredmény-számítást? Másképpen: az OEP kódra kalkulált eredményt megbontja-e szakmakódok szerint?	a. Igen b. Nem		
7.	Ha készült ilyen eredményszámítás, annak mi volt az eszköze, milyen informatikai támogatás van (ha egyéb informatikai megoldás, azt kérjük részletezze a megjegyzés rovatban)?	a. KVIK szoftver b. CT EcoStat-modul c. SAP-modul d. Excel-tábla e. Egyéb informatikai támogatás		
8.	Ha készült üzemgazdasági szemléletű eredményszámítás osztályokra/szervezeti egységekre, vagy azokon belül tevékenységekre, milyen gyakorisággal történt 2013-ban?	a. Évente egyszer b. Félévenként c. Negyedévenként d. Negyedévenként, kivéve az I. negyedévet e. Havonta f. Egyéb (Kérjük, írja a megjegyzés rovatba a gyakoriságot)		

***Az üzemgazdasági szemlélet** - a kérdőív értelmezése szerint - időszaki teljesítmények és az azokért járó bevételek, valamint az ezek érdekében felmerült költségek egybevetése. (Szemben a kiadások be-/kifolyási időpontját figyelembe vevő pénzforgalmi szemlélettel.)

**** Szervezeti egység** az intézményben nevesített (pl: SZMSZ szerint) önálló egység. Ilyen lehet egy szakrendelés vagy azok csoportja, egy önállóan működő szakmai specialitás, részleg, amely nem osztály (pl.: fekvő diabetológia, egynapos sebészet, nappali kórházként működő rehabilitációs részleg). Egy szervezeti egységnek lehet több tevékenysége is (pl.: fekvő-, és járóbeteg-ellátás). A klinikai (diagnosztikai) osztályokat egyben szervezeti egységeknek is tekintjük. A felmérés során ebben a kategóriába tartozik a szervezeti egységek csoportja (lásd: szervezeti csoport) is.

VIII.6. 'KO2. Management and Controlling Activities and Functions in the Institution as a Practice of 2013'
questionnaire

#	Tevékenység	Működi k-e az intézm ényben ?	Melyik szervezeti egység végzi?	Gyakoriság <i>(Kérjük, a megfelelő cellába írjon x-et! Több válasz is magadható egy-egy tevékenységhez kapcsolódóan!)</i>								Megjegyzés
		a. Igen b. Nem	a. kontrolling b. Egyéb szervezet	Napi	Heti	Havi	Negyed- éves	Féléves	Éves	Eseti	Egyéb (A megjegyzésben kifejtendő)	
Tényadatok gyűjtése, feldolgozása												
1.	Szervezeti egység (szervezeti egység szintű analitikában vizsgált jelentett/finanszírozott) tény teljesítményének gyűjtése és nyilvántartása											
2.	Szervezeti egység (szervezeti egység szintű analitikában vizsgált jelentett/finanszírozott) tény bevételek gyűjtése és nyilvántartása											
3.	Szervezeti egység költségeinek gyűjtése és nyilvántartása (költség helyi nyilvántartás)											
Keretgazdálkodás												
4.	Keretgazdálkodás intézményi szinten (beszerzői/kötelezettségvállalói keret)											
5.	Keretgazdálkodás osztályos szinten (felhasználói keret)											

Üzemgazdasági szemléletű tervezés (beleértve az éves tervezést, de a lehetséges tervmódosítást is)												
6.	Intézményi teljesítmények (naturáliák) tervezése											
7.	Szervezeti egység szintű teljesítmények (naturáliák) tervezése											
8.	Intézményi bevételek tervezése											
9.	Szervezeti egység szintű bevételek tervezése											
10.	Intézményi költségek tervezése											
11.	Szervezeti egység szintű költségek tervezése											
12.	Intézményi üzemgazdasági eredmény tervezése											
13.	Szervezeti egység szintű a fedezet tervezése <i>(Az egység szintű fedezet tervezése során a szervezeti egységekre nem osztunk fel minden költséget, így a tervezett egység szintű fedezet nem tartalmazza például a központi igazgatást.)</i>											
14.	Szervezeti egység szintű eredmény tervezés <i>(Az egység szintű terv eredmény minden költséget - így pl. a központi igazgatást is - tartalmaz.)</i>											
15.	Intézmény szintű évközi várható eredmény kalkulációja (prognózis/várható számítás)											

16.	Szakmai esetösszetétel (nagyértékű beavatkozások elkülönített) tervezése (Ide értve a HBCS-n belüli, de kiemelten nagy költségű, és a gazdasági eredményességet jelentősen – általában negatív irányban – befolyásoló, esetek/eljárások/beavatkozások* mennyiségi, illetve az ezekhez szükséges anyagok/eszközök/készülékek megvásárolható mennyisége útján való tervezését is.)											
Terv-tény összehasonlítás, elemzés												
17.	Intézményi teljesítmények terv-tény összehasonlítása, elemzése											
18.	Szervezeti egység szintű teljesítmények terv-tény összehasonlítása, elemzése											
19.	Intézményi bevételek terv-tény összehasonlítása, elemzése											
20.	Szervezeti egység szintű bevételek terv-tény összehasonlítása, elemzése											
21.	Intézményi költségek terv-tény összehasonlítása, elemzése											
22.	Szervezeti egység szintű költségek terv-tény összehasonlítása, elemzése											
23.	Intézményi eredmény terv-tény összehasonlítása, elemzése											
24.	Szervezeti egység szintű fedezet és/vagy eredmény terv-tény összehasonlítása, elemzése											
25.	Szakmai esetösszetétel (nagyértékű beavatkozások elkülönített) elemzése											
Fedezet- és eredményszámítás												

26.	Intézményi szintű üzemgazdasági eredményszámítás											
27.	Szervezeti egység szintű fedezet-számítás üzemgazdasági szemléletben (Az egység szintű fedezetszámítás és tervezés során a szervezeti egységekre nem osztunk fel minden költséget, így az egység szintű fedezet nem tartalmazza például a központi igazgatást.)											
28.	Szervezeti egység szintű eredmény számítás üzemgazdasági szemléletben (Az eredményszámítás során minden költséget - így a központi irányítást is - felosztunk az osztályra.)											
Aktuális pénzügyi helyzet vizsgálata												
29.	Likviditás nyomon követése (tényadatok)											
30.	Likviditástervezés (előrejelzés)											
31.	Likviditáselemzés (terv-tény összevetés)											
32.	Pénzügyi mutatószámok előállítás, elemzése											
Szakmai mutatók elemzése, finanszírozás												
33.	Betegforgalmi adatok elemzése											
34.	Kapacitáskihasználtság (ágykihasználtság, TVK kihasználtság vagy a kapacitáskihasználtságot mérő bármilyen mutatók - pl.: egy szakrendelői órára jutó eset, egy orvosra jutó eset stb.) elemzése											
35.	Elvándorlás, bevándorlás adatok vizsgálata											

36.	Kódjavítás (kódolás optimalizálás, javítás a jogszabályi keretek szigorú betartásával, jelentő állományok, vagy kórlapok felhasználásával)											
37.	Finanszírozott teljesítmény elemzése és előrejelzése (finanszírozott teljesítmények elemzése szakmai/finanszírozási/kódolási szempontból)											
38.	TVK miatti degresszió elemzése											
39.	TVK mentesség miatti finanszírozási hatások elemzése											
40.	Egyéb szakmai mutatók előállítása, elemzése - kérjük, fejtsen ki néhány mutatót a megjegyzésben											
További controlling tevékenységek												
41.	Benchmark (összehasonlító) adatok készítése és elemzése											
42.	Egyedi (ad-hoc) elemzések, és döntéselőkészítő anyagok (pl. eredményjavítási akciók vagy beruházások elemzése, árképzés, önköltségszámítás)											
Egyéb fent meg nem nevezett funkció vagy be nem sorolható tevékenység, és pedig:												
43.	...											
44.	...											
45.	...											

VIII.7. International experiences in healthcare controlling

Any definition of international controlling (see Appendix VIII.1) is considered accepted; the controlling supports decision-making activities of the managers, so it is applied primarily at organizational (micro) level. In the healthcare institutions, higher control levels (mezo and macro level) and unification efforts may seem evident, due to low hospital number, similar work processes and protocol-based, standard services,. A similar conclusion can be drawn from the transposition of international health control experience into Hungarian practice.

When designing my research, I also tried to examine international control systems in the literature, but I did not find uniform system descriptions and sharing of practical experiences. Its fundamental cause can be the differences of health care systems (ownership, stakeholders, funding methods, incentive systems). As researchers, practitioners and inquirers are interested in operation of other systems, two cases (Scandinavian and Swiss experiences) are illustrated in this appendix. The purpose of the cases is not to summarize or evaluate the health system of the country, but to describe only the functioning of institutional health control system.

The Norwegian case was made with the help of Árpád Tóth and the Swiss case was based on the experience of the Spital Davos institution, sponsored by SROP-4.2.2/B-10/1-2010-0023²².

²² Grateful thanks to the indispensable professional help and very valuable advice of Árpád Tóth and Fritz Brand.

Controlling system in Norwegian hospitals

Norwegian healthcare institutions are not required to use a national control system, but each institution uses the same software for accounting, records and provides data on a uniform accounting regulation. The controlling system is a managerial tool, where institutional collection, grouping, interpretation of data and analysing of performance occur individually and institutionally. Consequently, the introduction of the controlling system is restricted to the mandatory data service to the government (Ministry of Health).

Health policy and strategic targets are broken down into institutional levels with the involvement of regional agencies. For hospitals, annual plan and expected indicators required, which can be divided into three obligatory elements: (1) specific system of expectations, (2) indicator system, and (3) data service to National Statistical Office.

- 1) The Norwegian Ministry of Health defines an annual requirement system for regional agencies which is defined in indicators and plan numbers, for each hospital. This is controlled by a third-year reporting system, in the form of plan numbers, indicators and textual report. To learn more about this, see the <https://helsenorge.no/Kvalitetsindikatorer> page in Norwegian. This page includes the reported fields, the definition of indicators, data service information, and also processed data.
- 2) The ministry operates a national indicator system for indicator type data services of health institutions. The system initially started with 36 indicators, which are constantly being developed and 20-25 indicators are added annually. Today, there are around 100 indicators, which are formed in several dimensions (e.g. male and female). About 6-8 obligatory indicators are monitored continuously, as tumor rate, survival rate, rate of treatment begun within 20 days, etc., with a standard threshold of 70%.

Over the past two years, quality indicators such as hospital infection rates, in-patient recurrence of elderly patients within 30 days, leg amputations for diabetics and cesarean section are becoming increasingly important. These indicators are also precisely defined and the method required to calculate is also available.

3) The National Bureau of Statistics collects and publishes data (Samdata), but the regional agencies have reporting obligation instead of health care institutions and they provide direct information about:

- health care (outpatient, inpatient, one-day care);
- performance financing (DRG);
- adult, child and youth psychiatry, addictology;
- inpatient day and nursing time;
- bed occupancy;
- annual working time in 'full time equivalent'.

Government strategic objectives include the precise definition of healthcare costs, which was supported by a framework five years ago. This system

- makes obligatory the use of case cost calculation;
- regulates the production of case-level data by 12 elements (unlike the Hungarian 50-element DRG system);
- allows the institution to choose the cost-collection method: top-down cost allocation or bottom-up cost collection is possible;
- based on the cost-collection, simple statistical data (minimum, maximum and median values) divided into DRG should be provided.

The development of the current system is continuous; the entire database will be built in the next 2 or 3 years. During the development of the database, the problems are assessed and integrated into the expectation system, such a settlement problem of salary cost (some elements of the salary cost (overtime, sick pay, etc.) are at least one month delay into the system) and the correction is indispensable because of the extremely high (70-80%) cost ratio.

Controlling system in Swiss hospitals²³

Despite the fact that in the mid-1980s some hospitals recognized the usefulness of analytical accounting as a centralized internal management tool, it was only spread after the health insurance law entered into force (year 1996), with the purpose of pricing and traceability. The Act on Health Insurance and the Classification and Cost Accounting of Hospitals and Health Institutions demanded a clear and nationally uniform methodology. For that reason, in the summer of 2002 the REKOLE®²⁴ project is started. The project was supported by the Council of H+²⁵ and helped standardize and improve the quality of the bookkeeping of participants. Later, the revision of Health Insurance Act (in 2007) brought significant changes to the funding of hospitals: knowledge of costs and benefits was an indispensable condition for SwissDRG, because of abusive cases, investments and qualitative transparency.

REKOLE® is a cost accounting and management tool for any (private or public) hospital in active care, rehabilitation, psychiatry and long-term care. It was kept in mind that accounting has to be as easy as possible. The manual book sets out the theoretical bases, guidelines and methodological elements of the program as well as introduces practical examples. It defines the (primary and secondary, or direct and indirect) costs, expenses, income and the product itself. The costs include amortization: some depreciation rate differs from Hungarians one: IT tools have 25%, office, communication tools and vehicles have 20%, building has 3% depreciation rate.

²³ based on REKOLE handbook

²⁴ Revision der Kostenrechnung und der Leistungserfassung

²⁵ <http://www.hplus.ch/>, available in German, Italian and French

IX. PUBLICATIONS OF THE AUTHOR

IX.1. Publications in Hungarian

Journal articles

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Krenyácz Éva, Döbrössy Lajos, Gulácsi László, Dózsa Csaba [2007]: Gyakoribb daganatos megbetegedések társadalmi betegségterhe Magyarországon. IME: INFORMATIKA ÉS MENEDZSMENT AZ EGÉSZSÉGÜGYBEN 6:(8) pp. 41-44.

IX.2. Publication in English language

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Society & Economy in Central and Eastern Europe